London Group at Astronomical Meeting.

Dr. and Mrs. H. R. Kingston, the former director of the departments of mathematics and a of the Summer school of the University of Western Ontario, and Rev. and Mrs. W. G. Colgr at the gathering of astronomers meeting at David Dunlap Observatory. Mr. Colgrove's c ments, entirely created during his spare time as an amateur, created much comment a of the society.

Oct 28/58

~~Noted~~ Lecturer Minister Dies

A former United Church minister and noted public lecturer, the Rev. William G. Colgrove, M.A., B.D., 86, of 2 Christie St., died Sunday at St. Joseph's Hospital. oct 26/58

Private funeral service was held yesterday afternoon at his residence conducted by the Rev. George Goth, of Metropolitan United Church.

Taught Astronomy

Following his retirement from the ministry, Mr. Colgrove became a noted lecturer in astronomy at the University of Western Ontario. He was an inventor as well, and many of the laboratory instruments used in science departments of Canadian universities have been designed by Mr. Colgrove. Much of the dem-

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REV. W. G. COLGROVE
- - - dies at age 86

For his work in astronomy, he was awarded the Chant medal of the Royal Astronomical Society of Canada in 1943. He received the award for his careful scale models of the solar system. The medal was awarded once a year to an amateur astronomer in Canada.

Varied Service

During his years at the university, he served as assistant in the Department of Geology, taxonomist in the Department of Botony as well as lecturer in astronomy.

He also received acclaim as an author of poetry, of specific articles and religious-scientific literature.

Born in London, Mr. Colgrove received his education at Western, McGill and the Boston Theological Seminary. He served in many churches throughout Canada.

Surviving are two sons, Dr.

Taught, Wrote After Retiring

London, Ont., Oct. 27 (CP)—Rev. W. G. Colgrove, 86, a former United Church minister and noted lecturer, died here Sunday.

Following his retirement from the ministry, Mr. Colgrave became a lecturer in astronomy at the University of Western Ontario. He was an inventor as well, and designed many of the laboratory instruments used in science departments at the university.

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Born in London, he received his education at the University of Western Ontario, McGill University, later studying at the Boston Theological Seminary. As a United Church minister, he served in many churches throughout Canada.

Surviving are two sons, Dr. Gordon of Copper Cliff, and Roger of Toronto; and one daughter, Mrs. Ada Kaq, Toronto.

Oct 26/57

G. COLGROVE

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's Hos- , 1958, the adstone Colgrove, year. Husband of the Mary (Barons), father of Ada (Mrs. Kay), and Rogers (Pete), of Toronto, and Gordon of Copper Cliff, also survived by 3 brothers, Charles E., of Toronto; Robert J., of Los Angeles; Mark G., of Calgary, and one sister, Mrs. Clara May Symmonds, of London, and 3 grandchildren. Private memorial service. Request no flowers.

ROBIN KAY

Let's tell a tale of happenings
About a tiny boy,
Who came to live at our house
No bigger than a toy.
His mother said be quiet please,
Just whisper when you talk,
Because you might awaken him
And he'll begin to squawk.

We whisper,whisper,whisper soft
And tiptoe round the place,
But when the child is wide awake
He leads a merry chase.
One day he was so ravenous
He bit her nipple sore,
She was so cross she lectured him
And sat him on the floor.

But Robin cooed and giggled there,
The happy little soul,
And when he had his midday meal
'Twas from a purple bowl.
Then Grandpa made a small handcar
On which he forward sped,
But soon he tumbled backward off
And bumped his little head.

He bellowed like a great fog-horn
And whooped it up so strong,
The neighbors could not help but hear
And wondered what was wrong.
And then he went to nursery school,
And taught the teachers much
About events at our house,
Enough to beat the Dutch.

With plasticene he models well,
And builds with Tinker-toy;
He wants to be a Bear-cub scout,
He surely is a boy;
But soon they moved to Toronto
With his dear Uncle Pete;
Sometimes they come to visit us
And he is very sweet.

over

W.G.Colgrove.

DEDICATED

TO THE

REV. W. G. COLGROVE, M.A., B.D.,

ON ATTAINING

HIS EIGHTIETH BIRTHDAY,

FEBRUARY 26th,

1952.

THE OCTOGENARIAN!

When William Colgrove came to Town,
In Eighteen Seventy-two,
London City was in her Teens
And many Folks had naught to do.

A baby then was like babies now,
Unknown outside its home;
And none could tell,- e'en kith or kin,
How far the kid would roam.

His Mother nursed him well with pap
And lustily he grew,
And soon was **fit** to take his place,
Without the use of Brew.

His Parents'stilled within his heart,
A firm disdain of Booze;
And Nicotine? they taught was vile,
That, later, he let loose

His Tongue against the use
Of Liquors that debase;
And Tobaccos? smoked or chewed,
He'd meet their users face to face.

In Babyhood, his Father hoped
Someday he'd stand alone
And right the World with righteous Laws,
So named him William Gladstone.

In early years he went to School,
  And always topped the Classes;
His will was bent to gather Lore,
  So he disdained the Lasses.

A model boy, at home or school,
  He swiftly passed the Grades,
Through Lower School, and Higher,
  Until at last he scanned the Trades,

To find the one where he
  Could show his native art,
And earn the copious means
  To set him quite apart

To win, perhaps, and keep a Wife,
  Or, else, in University to start
And gain for him the Scholar's Crown,
  By cultivating mind and heart.

To trace his life is quite a Task;
  He kept his arduous way unbent,
(In spite of ups and downs and crosses)
  To glean the best by Centuries lent.

He Majored in Zoology, in old McGill,
  And topped the Fourth Year Classes;
And won the much sought Medal,- Gold,
  And the Love of one of the Lasses.

He crammed his life, for several years,
  With toils,- too many here to tell,
Until he heard a Heavenly Call,
  To save men's Souls from Hell.

He turned aside from Worldly Things,
  To learn the Truths of Heaven,
That he might show The Way of Life,
Found in the Gospel Leaven.

He wandered far across the Line,
  And lived in Sammy's Land,
Until affliction called him home
  To his native Canadian Land.

When bitter Grief had done its worst,
  And he was left alone,
To raise his Family,- three,
  He faced his Task without a moan.

But soon there came into his life,
  A comely, pretty Miss,
And he was drawn by Chords of Love,
  To a new,& happy, wedded Bliss.

On Circuits,far and wide, they went,
  To unfurl the Gospel Banner,
Until experience seemed to say
  Express yourself another manner.

He had eyes and ears for lovely things,
  Above, beneath, about;
He rarely trod the common grass,
  But someone heard him shout.

For he would see in ugly weeds,
  A Beauty, rare and fine;
It filled his soul with ecstacies,
  As if he'd found a Diamond Mine.

It harnessed all his energies,
  And sent him far and wide,
In search of Weeds and pretty Flowers,
  And laid them side by side.

A Preacher? Yes. But Botanist now,
  He sorted out what he had found,
And **familyized with toil and skill**
  The varied **Flora of the ground.**

With Artist's skill he labelled them,
  Sketched flower and leaf & all,
Until he had contrived a Prize
  To grace his Alma **Mater's** Hall.

His studious mind oft soared aloft,
  To scan the Starry Skies;
While deep within his Soul there grew
  A Plan to chart the Twinkling Eyes.

He took some Wheels from his Brain,
And Rods, on which they'd spin,
And made a mystic Merry-Go-Round,
To show the Sun and Earth akin.

And many other Gadgets came
From that strange head of his,
To show the ways of Heavenly Lights,
And teach all students,here,what is

The Way of the Creative Mind;-
Its stately order, constant, true,
With full disdain of Chance,
That man may trace His Steps anew.

At last he found his well-loved niche,
Professors' Aide at Western!
Where he, his gadgets, and his time
Had ample Scope at Lectern.

And what was his reward for all
That he had made and done?
No well-filled Purse, no loud Applause,
Was granted to this son.

But the Astronomers,Royal,of Canada
His genius had detected;
They pinned upon his ample chest
Their Medal, well-selected.

Deep in his Soul, he has a Prize
Which Pelf nor Praise has planted;
The well-spent time, a disciplined mind,
And ends, he sought, been granted.

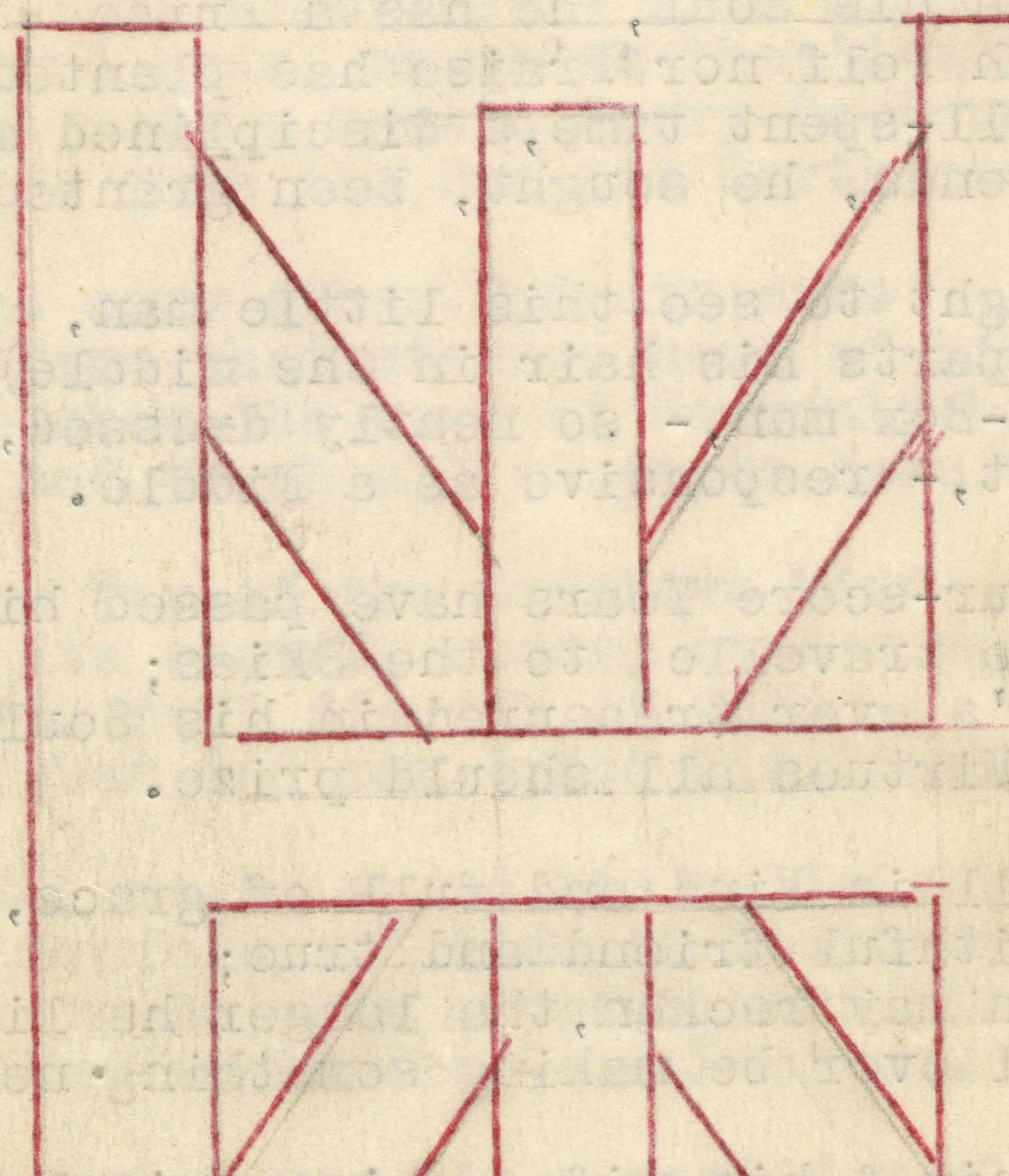
You ought to see this little man,
(He parts his hair in the middle)
A Band-Box man,- so neatly dressed,
Alert,- responsive as a Fiddle.

Now Four-score Years have passed him
As he travelled to the Skies;
But he's ever treasured in his Soul
The Virtues all should prize.

For Will is kind and full of grace,
A faithful friend and true;
And you may reckon, the longer he lives,
He'll ever be making something new.

So to him, & his wife,- his musical Mary,
Our very best wishes we send;
With the hope the Decline of the Hill
May be gentle and smooth to the end.

May lovely flowers litter their Path,
And Twinkling Stars shine too,
To make the West-Way easy,
'Till the Golden City they view.



Oct. 31, 1952.

No. 3 History

CHARLES EVERETT COLGROVE

Born at London, Ont., Sept. 22, 1867

At the age of six years he commenced to attend a private school carried on by the Misses Horton, whose home joined his, learning the three R's, some music and some drawing, but owing to uncertain health was unable to attend for regular studies for several years. Owing to these conditions his father made arrangements for his lessons at the Art class of the Mechanics Institute, then under the Tutor, Mr. John Peel, father of Paul. This was within walking distance from his home in South London. He soon showed a strong aptitude for mechanical drawing and geometry, and these became his chief business and pleasure for life, and his deep understanding of the basis of them were the main source of his success. He was employed for some time in the drug business, and there acquired a small knowledge of Latin and Greek.

At the time of the N.W. Rebellion he was a Cavalry Trumpeter. Later in 1916 he was a member of the Rifle Brigade. He spent the years of 1886 and 1887 in the west as a hotel clerk in Minnesota, and the following summer was a herder on a herd of 1014 head of cattle on the Cosmos Plains. At the end of the season he helped take a herd of cattle of 800 head to Montana, through the Bitterroot Mountains. After two years he returned home at Christmas, having gained good health and some experience.

The next 12 years were spent by him as a commercial traveller, going from coast to coast. During this time he was married and became the father of one son and five daughters. Three daughters are married and one at home now. During this time he resided five years in Montreal, then moved to Toronto. He was the pioneer of the corrugated box in Canada, and invented, designed and built machines for its manufacture and commenced the business and carried it on for 20 years with profit under the title of the Adams Cellboard Co. Ltd., of which he was the president and manager.

He was also manager of the Adams Machinery Co. and president of the Greenville Paper Mill Co., and chairman for a term of the Canadian Corrugated Box Association.

In 1928 being in poor health and worn out, he sold out the business and retired. Then for a time, being a registered Ophthalmist, managed an optical business. He was a member of the Commercial Travellers' Association, and for 32 years travelled by rail over 240,000 miles and by automobile over 140,000 miles.

His only sport was tennis, and he was a member of the McGill University Club for three years, and a small shareholder in the Toronto Tennis Club. In religion, he is a Presbyterian, and has no vices, has good health and no infirmities. Age 85 years. Height 63 inches. Weight 120 lbs.

EIGHTY YEARS

1.

When I had lived on borrowed time
A dizzy decade more than most,
Who fade at three score years and ten,
And seldom have a chance to boast
Of what they've thought or said or done
To gain a place within the sun.

2.

My pretty, scheming, better-half,
Unknown to anyone in town,
Planned how she'd fix a glad surprise
For her dear husband, as a crown
For many years of hectic life,
Endeavouring to please his wife.

3.

So when the anniversary
Of my grand, natal day arrived,
I saw the gorgeous plan unfold
As it had been so well contrived;
And then I knew that I would be
The centre of a talking bee.

4.

The first to come that happy morn
To join the fun for father's sake,
Were Pete and Sis and Robin Kay
From fair Toronto by the Lake;
They brought a score of daffodils
To garnish all the window sills.

5.

And placed a large Azalea
Fullblown upon my trembling lap,
And in my hand a well-filled sock
Which made my wondering eyelids flap;
I looked around and grinning said,
"Will someone quickly hold my head".

6.

But ere I could get off my chair
There came a telegram from Gord,
Together with a rose bouquet
To glorify our festive board;
I gasped,"That's from our second son,
And Doris, Barry, Marilyn.

7.

And then 'twas time for lunch you see,
So Mom and I and Sis and Pete
And hungry Robin Colgrove Kay
Looked round for something good to eat;
And then we had an hour's rest
Before we donned our Sunday best.

8.

When suddenly the doorbell rang
To usher in a troubadour,
Who sang the "Happy Birthday" song
Like Harry Lauder, as of yore;
His name is Wallace, famous Scot,
But with no kilties we could spot.

9.

By three o'clock some folks had come,
With gifts of several different kinds,
Of food and fruit and flowers rare,
And books from literary minds;
All afternoon and ~~in~~ night as well
They came to ring our front doorbell.

10.

The second group was ministers
From modest domiciles around,
Each with his wife upon his arm,
No better neighbors could be found
Whose years entitled them to be
True knights of this fine chivalry.

11.

And after them the doctors came
To shake my hand and wish me well,
And comment on my youthful form
And envy me a wife so swell;
They talked and ate and drank some tea
And then departed praising me.

12.

It was a great surprise, 'tis true,
And one that ne'er can be forgot,
Because its happy fellowship
From truly Christian love was wrought;
They made nice speeches, full of cheer
And wished I'd reach my hundredth year.

So thank you chilens for the way
You helped observe my big birthday;
When you are eighty I'll be there
To put you in your old armchair.

DAD.

THE UNIVERSITY OF WESTERN ONTARIO

London, Canada.

Department of
Mathematics and Astronomy

Revised
May, 1944

SOME AIDS TO THE TEACHING OF ASTRONOMY

The Department of Mathematics and Astronomy at the University of Western Ontario wishes to call attention to a series of original, simplified, efficient instruments for teachers of astronomy. These instruments, designed by W. G. Colgrove and H. R. Kingston and built by the former at the Hume Cronyn Memorial Observatory of The University of Western Ontario won for him The Chant Medal of the Royal Astronomical Society of Canada in 1942. Those who are interested in this fascinating subject are invited to visit the Observatory and see this unique equipment.

These instruments have been tested in Astronomy classes at the University and in demonstrations to a large number of public audiences and have proven so highly satisfactory that it has been decided to make them available to schools, colleges and individuals. A partial list follows:

1. **Manual Planetarium**—This model is 3 feet high, is wired for hydro and has a 60-watt lamp for the sun. The nine planets are on wire arms that may be revolved to their proper positions at any time (see No. 7 or 8 or Note 5 below). The planets are in colors as seen in a telescope. The moon is attached to the earth so it may be placed in any desired position around the earth. There are two graduated setting circles, one for placing the planets in right ascension, the other for aligning them with the sky at any time on any date. A card disk attached to the earth acts as our horizon plane. **Price, $25.00**

2. **Sotellunium.**—This mechanized instrument is 40 inches long and 26 inches high with a circular open iron base and can be easily carried in one's car. The earth is a globe 4 inches in diameter on which the land and water areas are shown. It is carried on an iron arm 30 inches long and is illuminated by a 60-watt lamp representing the sun. The moon is made to revolve on an inclined orbit and eclipses of the sun and of the moon are strikingly demonstrated. In the case of solar eclipses both the umbra and penumbra are very clearly shown as are also their paths across the earth. The phases of the moon are also effectively produced. The earth rotates on an inclined axis with a constant direction, and in its revolution around the sun shows clearly its position at the equinoxes and the solstices, and the causes of the seasons, the midnight sun, etc., etc. **Price, $60.00**

3. **Planeto-Zodiac.**—This is a much simplified apparatus, including the 9 planets surrounded by the Zodiac, on a two-foot disk of masonite, marked with the names of the constellations for setting the planets from the planet-tables in "An Easy Pocket Star Guide for Beginners" (see No. 7 or 8). The margin carries also hour numbers for setting the planets by their right ascensions as given for the 15th of each month in "The Observer's Handbook" (see Note 5 below). Further, around the margin are fortnightly dates by which the disk may be oriented to agree with the sky at any time of day or night on any date of the year. This orientation shows in a striking manner the seasonal changes in the sun's altitude, in its places of rising and setting, etc...**Price, $15.00**

4. **Models of Planets.**—These are wooden spheres all turned to the same scale. The earth is ½ inch in diameter and Jupiter is 5½ inches through. They are painted their colors as seen in a telescope and all stand in a row on a heavy wooden base. They impress upon the mind very effectively the relative sizes of the members of the planetary family............**Price, $5.00**

5. **New-Way Star Map.**—This map, 8 inches in diameter, is new and unique, and meets a real need. It is extremely easy to use. It carries an horizon with respect to which it may be rotated, causing the stars to rise, culminate and set, just as they do in the sky. Around the margin are dates which enable the map to be set to show the sky as it appears at any hour on any date in the year. Planets or any new object in the sky may be quickly plotted among the stars either by the constellations in which they are located (see No. 7 or 8) or by their right ascensions and declinations (Note 5 below). The southern sky is on the front of the map and the northern sky is on the back. Directions are given on the horizon. Some interesting up-to-date information about the brighter stars, etc., is printed on the envelope. **Price, 25c; in lots of 20 or more, 20c each.**

6.—**Simplex Planet Placer.**—On this instrument, 8 inches in diameter, the sun and planets are made of cardboard and the latter in their cardboard arms may be easily and quickly set in their proper positions among the stars just as in the Planeto-Zodiac (No. 3). It is a much reduced form of the Planeto-Zodiac and is a mate to the New-Way Star Map. Directions are printed on the back. **Price, 25c; in lots of 20 or more, 20c each.**

7. **Solar System Data.**—This booklet contains over 400 interesting facts about the Solar System including a table of planet positions for several years. This pocket edition is a mine of up-to-date information which gives 30 items and various deductions about each important member of the Solar System. **Price, 35c.**

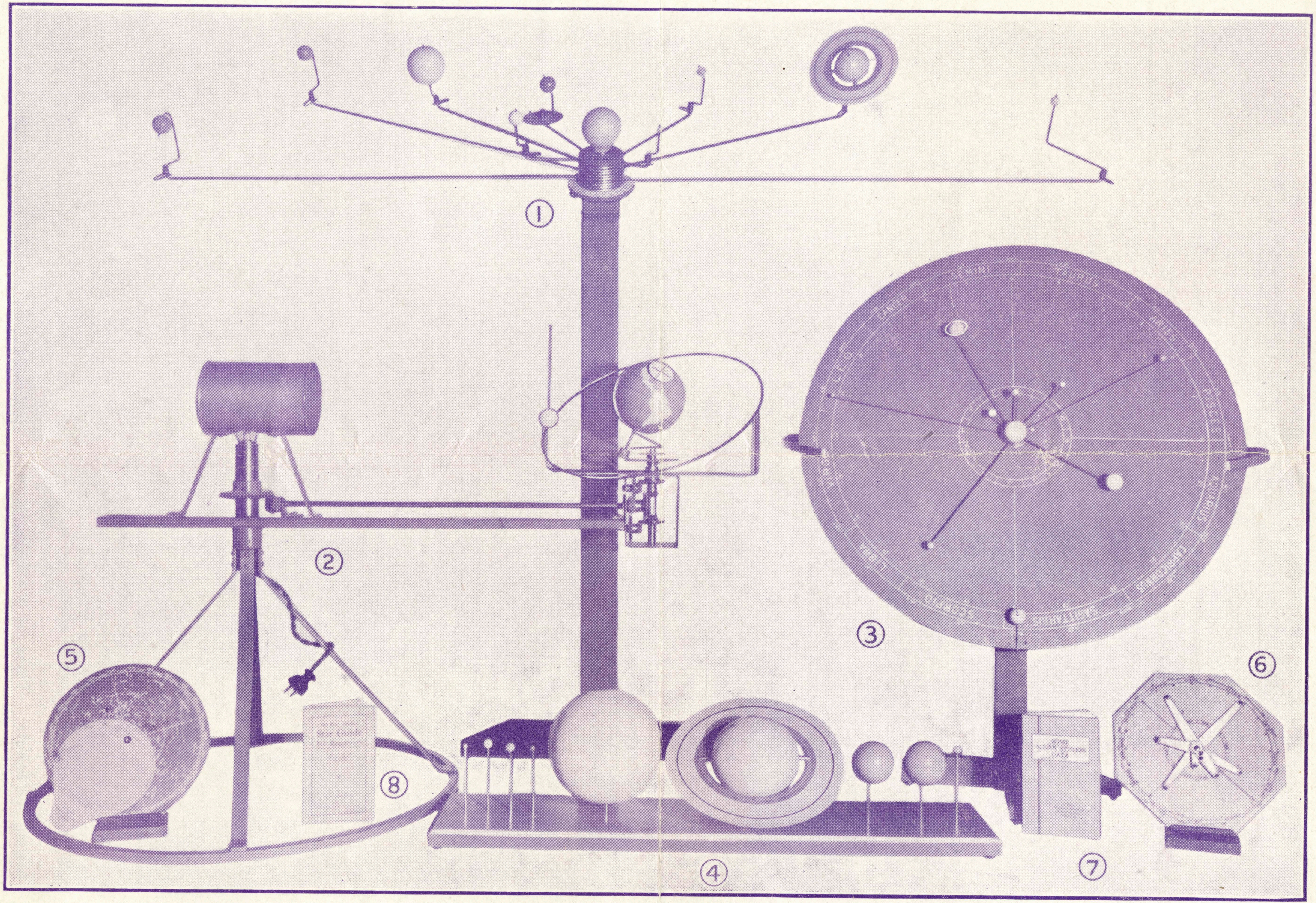
8. **An Easy Pocket Star Guide for Beginners.**—This booklet contains brief information on the motions of the stars, and maps of the sky (white stars on black background) accompanied by name-charts, for every night in the year. It has also a table of planet positions month by month for several years, by means of which the planets may be easily placed in their proper places on the foregoing instruments. At the back of the booklet is a list of the constellations with their English names.....................................**Price, 35c.**

NOTE:—

1. Each instrument is accompanied by directions for its operation.
2. The first four of the above instruments are for demonstrating by the instructor. They are strongly built so that students also may use them and thus fix firmly in mind the facts demonstrated.
3. A PACKET (special offer) containing Nos. 5, 6, 7 and 8 above is available for $1.00. With this material in his hands a person is equipped to acquire readily a happy acquaintance with the stars and planets and a clear understanding of their motions.
4. All prices are F.O.B., London, Ontario.
5. "The Observer's Handbook," an annual publication of the Royal Astronomical Society of Canada, containing facts about the stars and day-by-day information regarding the sun, moon, planets, meteors, etc., may be obtained from the R.A.S.C. Library, 198 College Street, Toronto, Ontario...........**Price, 25c.**
6. Besides the aids mentioned above, we have designed and built the following:—Galaxy, Comet Tracer, Stellar Radiant, Planetary Helices, Ecliptic Circle, Constellarium and Motor Planetarium.
7. For further information address Dr. H. R. Kingston, Department of Mathematics and Astronomy, University of Western Ontario, London, Canada.

(OVER)

THE UNIVERSITY OF WESTERN ONTARIO



(1) Manual Planetarium.
(2) Sotellunium.
(3) Planeto-Zodiac.
(4) Models of Planets.
(5) New-Way Star Map.
(6) Simplex Planet Placer.
(7) Solar System Data.
(8) An Easy Pocket Star Guide.

(OVER)

I did this
M.A.C.

The Next Billion Years

Mr. President, Ladies and Gentlemen —

The 15 minutes alloted to me is so brief compared to the enormous period of time which I must cover that the ratio would be $\frac{1}{35 \text{ billion}}$

Professor Reavely has told us a great deal about the advance of life and civilization on this earth up to the present. Now I must grasp the torch of knowledge and carry it onward and upward far into the dim uncharted future.

We are convinced that mankind will doubtless inhabit this planet for many more thousands of years, perhaps for many millions which I shall now describe. Man's stay here, of course, depends on a number of items — among them: the constitution of man himself, the stability of natural law, the quality and quantity of supply and the skill, knowledge and inventive genius of men and women.

Because of the changing physical conditions which are gradually taking place man will have to rebuild himself to suit them. He will have to procure the raw materials necessary for continued existence and he will have to learn how to produce the products he will need.

We are told that there are only two kinds of natural resourses:
1. those that grow and reproduce themselves such as vegetation and
2. those that are static such as rocks and minerals. Of these, the former will naturally last a very long time, but the latter will be gradually used up. Take, for example, petroleum, we are told that all known sources beneath the United States can supply only enough oil to last about 30 years more — 1 billion barrels per yr. And it is said that the various kinds of coal may last for perhaps 3000 years if the demand is not too greatly increased.

The other minerals and metals of the mountains and the mines are definitely limited and will disappear with the centuries but by that time we hope man will have discovered and harnessed other agencies and sources of raw materials.

The population of the world is about 2 billions or double what it was 100 years ago. Taking the world as a whole there is said to be possibily sufficient non-renewable resourses eg. metals and minerals to last the slowly increasing population about 1000 yrs. If, however all the people became Christians the supply would last indefinitely. But what about a billion years hence, and what may be the world's condition then? Then! then! what then? Why then there will be no world and no people on it for mathematical astronomy has the answer and, if true, this entire planet will be destroyed by the moon before it is 40 million years old instead of being frozen as the — heat-death th t. But more of that later.

One is tempted to speculate on what may happen to us and our successors as these milleniums steadily pass into history.

What is the present outlook? Let us make a brief survey. We shall doubtless advance in every field. Our present knowledge will lead us to economize with regard to our static resourses and we shall gradually learn by research to create new commodities to supply our increasing demand. We shall invent and discover the best ways of using our living resourses. In other words, we shall utilize every practical method and explore every promising atomic combination that appears in the realm of both organic and inorganic chemistry.

The vast field of physics, both theoretical and applied will be deeply, broadly and intensively cultivated because the efforts of man in these two extensive fields are absolutely necessary to our continued existence on this planet. But that is not enough, we want much more than mere existence and we shall need more natural energy to do the new types of work that grow out of our needs. We shall try to satisfy three very important claims:— First, that of augmented man power by the development of a truly super race through the unique contributions of applied biology and biochemistry. The hormones the glands and the vitamins will play a fundamental role. Second, that of increased static resourses which we shall find in the ocean from which we shall extract its various chlorides and carbonates including sodium, calcium and potassium as well as aluminum magnesium, iron, copper, silver and gold. These will be still there when the mines and wells have ceased to produce. Third, that of more energy which we shall capture from the sun which bombards the earth with 230 trillion horse power every second. We shall also harness the tides with engines whose only limit is the number that we can set up. We shall begin to unleash atomic energy.

But even with these three great needs satisfied we cannot stop. We shall press the matter of the conquest of disease, we shall lengthen the life-span, we shall delay senility and revive the dead.

While we are attending to these important developments we shall not overlook some equally interesting improvements. We do not intend to paint the lily or dye the sunset but we do hope to bleach the blacks, tame the Huns and civilize the Japs. We do intend to make marriage safe, even for angels. We do intend to eliminate the damnable alcholic and narcotic traffics. We do intend to slay the gambling evil. We do intend to destroy the social vices. We do intend to make morality and spirituality supreme.

The animal we call man will be educated, cultured and controlled, not by external compulsion but by internal principle.

There is not time to discuss minor improvements such as:-

changes in manners, housekeeping and dress — or should I say undress?
" " occupations, vacations and habits — perhaps the women will quit their nonsense & vote.
" " hairdressing, moustaches and cosmetics — look at moustaches
" " food, diet and beverages — alcohol, dirty water & drugs
" " pets, games and toys — full size mechanical animals
" " teaching, training and learning — That'll learn you
" " calendars, clocks and time — War time
" " mathematics, astronomy and astrology — Befuddled nonsense
" " art, architecture and sculpture — Epstein creations
" " horticulture, agriculture and stock raising — crossing species
" " music, song and poetry —
" " theatre, drama and movies —
" " thought, philosophy and theology —
" " education, culture and travel —
" " medicine, surgery and psychology —
" " science, research and seance —
" " language, literature and exploration —
" " communications, commerce and treaties —
" " radio, telephony and television —
" " politics, statecraft and warfare —
" " lax morals, superstition and pseudo-religion —
" " preaching, practicing and prayers —

and a thousand other changes for which we must get ready.

I say, there is not time to discuss them just now — we must examine the astronomic aspects of the subject. Let us turn to the sky.

A few years ago when men first measured the moon's distance it was about 240,000 miles away and revolved in about 29 days. Since that time we have learned that the tides exert a braking action on the earth's rotation equal to 20 billion h.p. so that each succeeding century, measured by days, will be almost 1 second shorter.

By the end of the first million years of man's existence this braking action will have increased fiftyfold and the day will be a little longer.

By the end of 5 million years the human race will have reached its climax and be perfectly adjusted to its environment and its individual members will doubtless live to the over-ripe old age of 3000 years. Everyone will be happy. — Stanley Jones said the four signs of old age are Baldness, Bifocals, Bridges and Bulges. Human evolution will have ceased and mankind will be rid of some his ugly primitive features such as hair, nails and teeth but how could a man be happy if he couldn't occasionally bite his wife's ear? or how could a woman be happy if she couldn't paint her claws?

By the year 8 million the day will have become 48 hrs long for the earth's rotational speed will be only half what it is now while the moon will have added 1/5 to its present distance and its month will be 40 days long. Perhaps you can begin to guess what will happen.

Gradually the moon will move farther and farther away and revolve more slowly until the year 17 million when the earth's races will realize that their stay on this world will some day come to an end and they will seek safety on some other planet. The ways and means for doing this will occupy the mathematicians, physicists, chemists and inventors for thousands of years while a great variety of experiments with space ships of vast proportions will be made. At the same time a long series of experiments of another kind will be undertaken in an effort to develope people capable of living with only 1/10 of the oxygen in our atmosphere and with a body temperature about 10° higher than ours. These will be the first passengers to fly to Venus and trips will be made in real earnest but not more than 1% will arrive and land safely — nevertheless they will finally colonize the planet. It is said that such super humans will have developed several special senses such as the ability to converse with any one anywhere at any time by means of a new type of television and a telepathic language. They will be able to swim in the air and, by stretching the arm or leg or both, be able to reach anything within 25 feet. Perhaps the neck will stretch too. And when it comes to telling fish stories every minnow will be a whale.

After many more centuries the moon will have to turn back toward the earth and by the year 36 million, it will be only 1/5 its present distance away and will appear 25 times as big as the sun. It will raise the ocean level some 200 yards. Roche's limit will soon be reached & the earth's attraction will cause great tidal strains on the solid, rock-bound moon so that the surface will begin to crack and the entire body disintegrate. About 1/20 of the heavens will be shut from view and the sky will be filled with dust and fragments so numerous and so terrific in their impact as to destroy all life that cannot escape. The meteor shower of 1833 was only a sand storm compared to this torrential avalanche of flaming rocks which will continue to engulf the world for a hundred years and more until the whole scorched earth will become a blackened cinder flying forever through the darkness of planetary space.

While the major portion of the world is passing through this ghastly cosmic holocaust the remaining inhabitants on the other side will be fighting for room on the Venusian space ships and most of them will get away before the fires reached them.

Venus will soon be overcrowded and the people will press for trips to Mars and Jupiter but Mars will be bypassed because of its small size. At 1000 miles per hour the trip from Venus to Jupiter will take about 50 years but what is that to folks who live 60 times as long.

By the year 1 billion man will have become master of cosmic energies. The cosmic rays will be his active servants and he will spend his time in the study of the most thrilling of all sciences - astronomy. The vast cloud envelope of Jupiter will be dispelled by heat released from the interior until sunshine and shadow will alternate as they now do on earth. The speed of the planets rotation will be slowed down by the braking action of its eleven satellites to about 100 hours so that the day and night will be 4 times as long as ours. The year (12 of ours) will remain the same but the number of days in it will be reduced from over 10,000 as now to about 1000. The inhabitants will not worry about the good old days on earth because the story of Mother earth and her midget tribes will have been forgotten for 100 million years.

Diana's Return
BOOK

Statement of Conference Course

III Year.

W. G. Colgrove, Swampscott, Mass.

A. For Examination:—

1. Biblical Hermeneutics — See B.U.S.T. Certificate enclosed.
2. Outlines of Psychology — See Western University Certificate inclosed.
3. Outlines of Universal History (Parts I + II.) — " " " written " " "
4. History of Christian Church — See B.U.S.T. Certificate enclosed.
5. The Land of Israel — " " " "
6. Written Sermon — This is in hands of Examiner.

B. To be Read:—

I have given the six prescribed books the required reading.

In 1905 I received A.B. from McGill University, Montreal.
" 1908 " " S.T.B. " B.U.S.T.
and am glad to report A.M. from the Western University last September, for special work.

Hoping the above statement of my conference work will promote me to the fourth Year I remain

Yours very sincerely,

W. G. Colgrove.

Boston University School of Theology

Boston, Mass. Jan. 4, *1909*

This certifies *that the bearer,* W. G. Colgrove *has taken the regular class instruction in the books of the Conference Course mentioned below, or their full equivalents, in this institution, and that he received on examination the grades subjoined:*

Bible History	
Manual of Christian Doctrine	
Plain Account of Christian Perfection	
Dicipline of the Methodist Episcopal Church	
John Wesley	
Introduction to the Holy Scriptures	
Systematic Theology	
Homiletics	
Biblical Hermeneutics	91
History of the Christian Church	97
The Land of Israel	92.
Grounds of Theistic and Christian Belief	92
Analogy of Religion	82
Christian Ethics	

Signed Samuel L. Beiler, Acting Dean.

This certifies also that the bearer, W. G. Colgrove *is a graduate of this institution and is therefore entitled to the benefits offered in Discipline, Appendix, Chapter VII, §4, subject to the action of his Annual Conference.*

Signed Samuel L. Beiler
Acting Dean.

THE WESTERN UNIVERSITY
OF
LONDON, ONTARIO

Jan. 30th 1909

This is to certify that Mr. W. G. Colgrove was duly received into this University as a student in the department of Liberal Arts, the University accepting without conditions his certificate of studies from the Genesee Wesleyan Seminary, of Lima, N.Y. in which he was credited with a standing of 85 % in Ancient History (incl. Eastern Empire). Mr. Colgrove also completed our courses in the political history of Greece and Rome, as well as the subsequent course of instruction in Mediaeval History (Emerton).

N. C. James,

President, Western University.

Statement of Conference Course.
IV Year
W. G. Colgrove, Swampscott.

A. For Examination :-

1. Grounds of Theistic and Christian Belief -
see B.U.S.T. certificate attached.

2. Butler's Analogy of Religion - | in Ethics at McGill.
covered by B.U.S.T. Diploma and included in my course
see also certificate attached.

3. Studies in Ethical Principles -
see McGill certificate attached.

4. Outlines of Universal History -
completed in November and December.

5. History of the Christian Church -
prepared for April and EXCUSED.

6. Essay - "The Soul of Saul" -
in hands of examiner.

B. To be Read :-

I have given the prescribed books the required reading, half of them having been covered in course at college and Theological school.

W. G. Colgrove.

Boston University School of Theology

Boston, Mass. Feb. 21, 1900

This certifies *that the bearer,* William G. Colgrove *has taken the regular class instruction in the books of the Conference Course mentioned below, or their full equivalents, in this institution, and that he received on examination the grades subjoined:*

Bible History	
Manual of Christian Doctrine	
Plain Account of Christian Perfection	
Dicipline of the Methodist Episcopal Church	
John Wesley	
Introduction to the Holy Scriptures	
Systematic Theology	
Homiletics	
Biblical Hermeneutics	
History of the Christian Church	
The Land of Israel	
Grounds of Theistic and Christian Belief	92.
Analogy of Religion	82
Christian Ethics	

Signed Samuel L. Beiler
Acting Dean

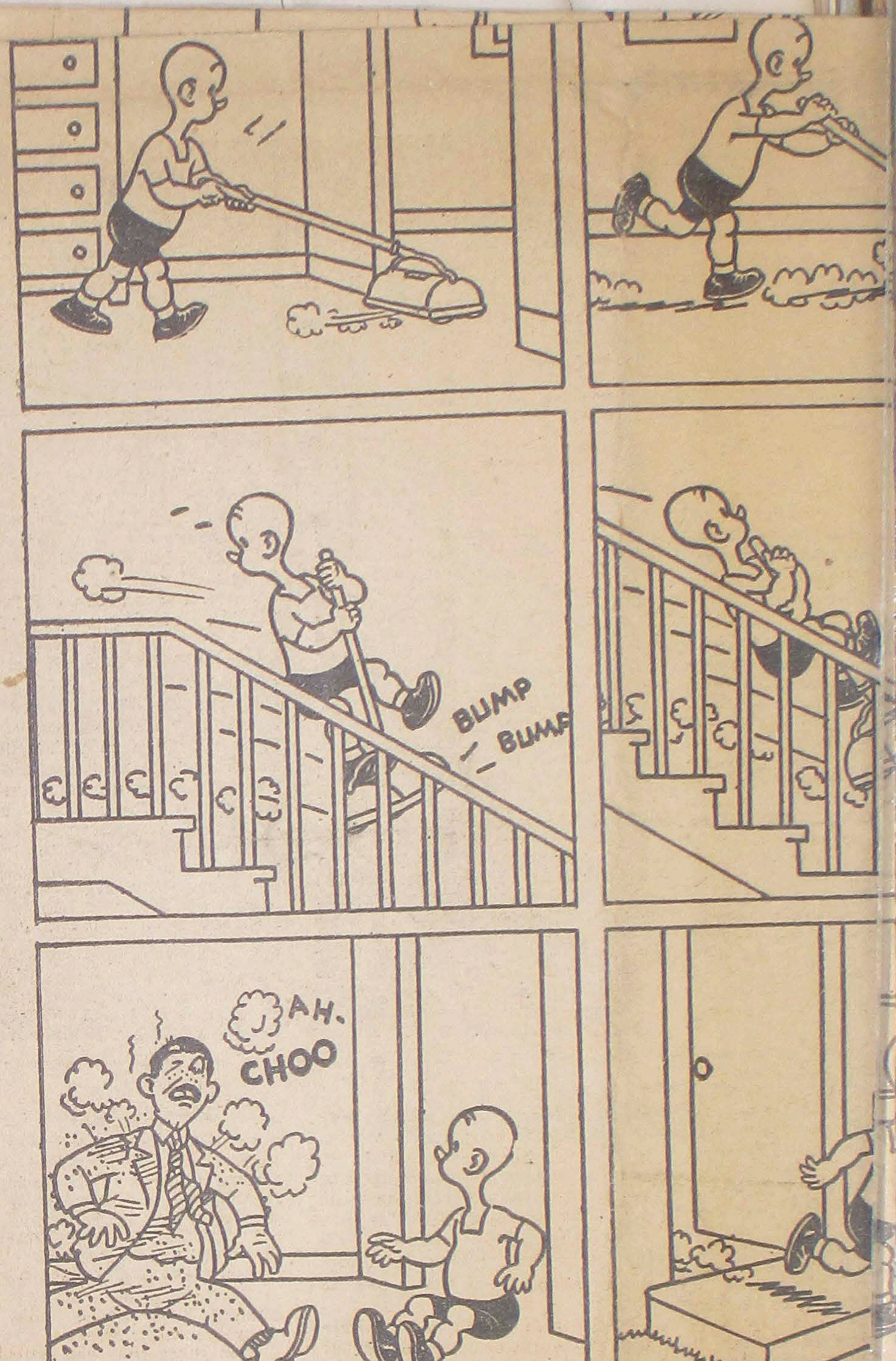
This certifies also that the bearer, William G. Colgrove *is a graduate of this institution and is therefore entitled to the benefits offered in Discipline, Appendix, Chapter VII, §4, subject to the action of his Annual Conference.*

Signed Samuel L. Beiler
Acting Dean.

THE COLGROVES

-- oooooooooooo --

Name	Born	Place	Died
Robert D	Jan.3,1834	Windsor Eng.	Oct.20,1893
Sarah J.Steele	Jan.17,1846	London Ont.	May 23,1930
Were married December 17,1864. Their family --			
Frederick R.	Feb.7,1866	London Tp.	Jan.20,1928
Married-			
Children- Grace, Robert,			
Charles E.	Sep.22,1867	Westmin.Tp.	
Married Margaret Webster			
Children-Helen,May,Verna,Jean,			
Wm.Gladstone	Feb.26,1872	Westmin.Tp.	
Married Annie L.Rogers1906Mary A.Barons 1921			
Children-Rogers G. Ada G. Gordon L.			
Victoria Eliz.	Jan.5,1874	Westmin.Tp.	July 31,1950
Unmarried.			
Robert Joseph	Jan.28,1876	Westmin.Tp.	
Married Florence			
Children- Kathleen, Lorraine.			
Clara May	Mar.1,1880	Westmin.Tp.	
Married Charles Symmonds			
Children- Harry Charles.			
George Henry	Dec.2,1881	Westmin.Tp.	June 1882
Unmarried.			
Mark George	Oct.25,1883	London Tp.	
Married Gloria			
Children- Maureen			



Copr. 1944, King Features Syndicate,

de Gaulle Ranks As Most Controversial Figure

By Peter Edson

FRENCH General Charles de Gaulle's acceptance of President Roosevelt's invitation to go to Washington would give us a first-hand gander at the most controversial cuss of the entire war.

People who have any ideas at all on this character come only two ways — they are either violently for him or just as violently against him. The people who are for him — the sentimentalist lovers of anything French and the critics of anything done by certain governments—have made the most noise. Thus the good in Gen. de Gaulle has received the most publicity, which is probably as it should be. The line is that de Gaulle is the embodiment of all French virtues, the leader of man who has emerged from the the Fighting French, the one fall of France. As such it is asked by his partisans and emotional sympathizers why the United States has not given him full recognition.

The other side of the de Gaulle character is best portrayed by his own actions, which reveal him as one of the world's most difficult people.

He is explained as a personification of psychologically sick France. Defeated, overrun by the Germans for four years, governed by Nazi collaborationists at home, undernourished, fighting underground, it is small wonder that the average Frenchman today possesses a terrible inferiority complex and behaves accordingly. If Gen. de Gaulle typifies that spirit he can perhaps be pardoned, but that still does not make him easier to deal with. His presumption is colossal, and apparently growing.

He began his career as head of Fighting French military resistance modestly enough. The British had their troubles with him before the United States was forced into the war, but the British were apparently determined that even if de Gaulle were a bad boy, he would be their bad boy and they'd make the best of him, willy nilly.

Even after North Africa was liberated de Gaulle was not too tough. He came to Casablanca in January, 1943, met Giraud and agreed to get along with him. Six months later, when the French Committee of National Liberation was established in Algiers, de Gaulle declared that the movement was non-

Gen. Charles de Gaulle

political and would end when France was free.

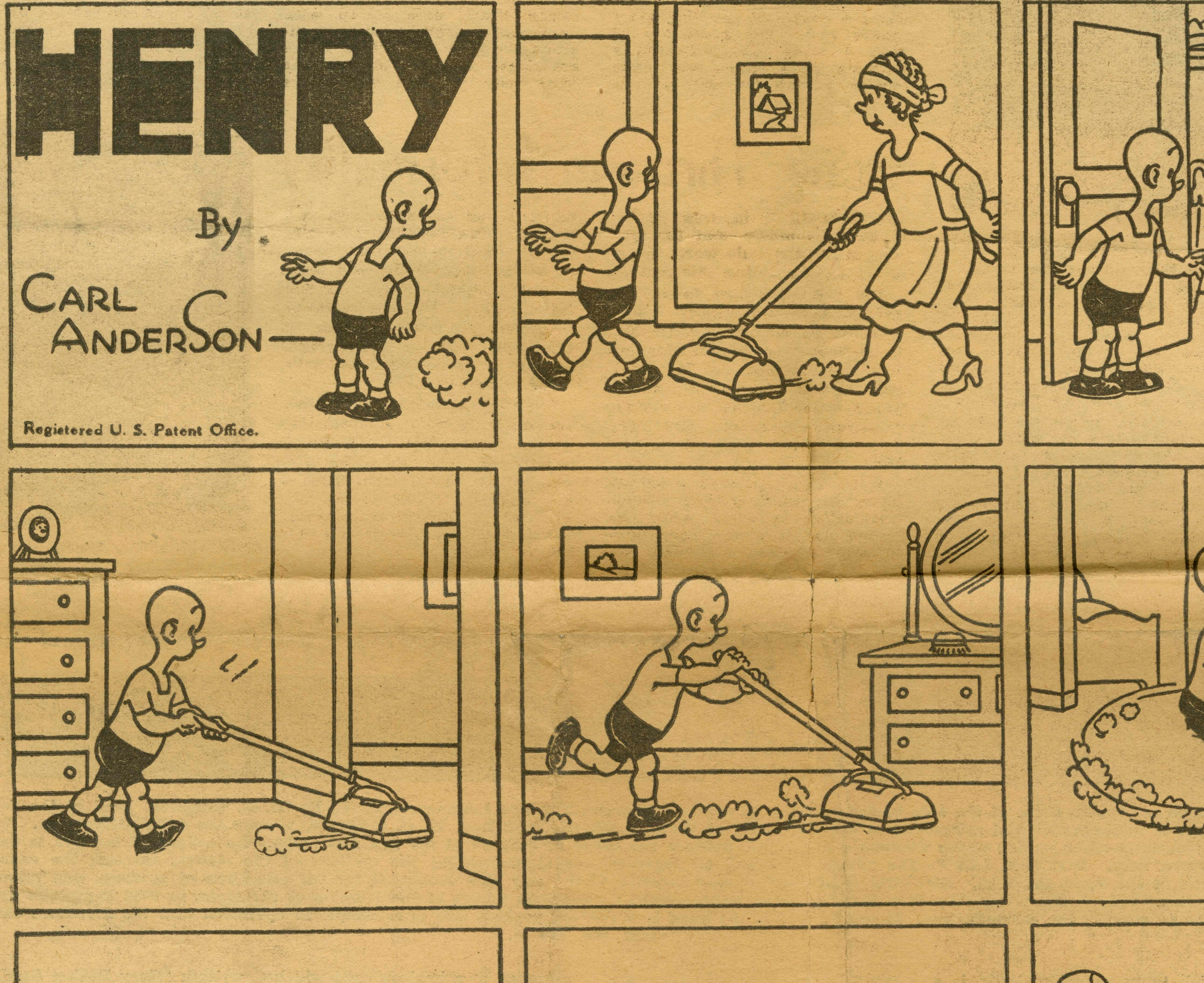
From those positions, jump six months to New Year's Day, 1944, when de Gaulle held a reception in Algiers as head of state, and six months further to the recent action of the French Committee of National Libera-

tion, abolishing itself
changing its name to Pr
sional Government of the Fre
Republic.

Politics and power have b
his complete ruination.

Instances of de Gaulle's
ability to co-operate are num
ous. Since the liberation
North Africa, his administrat
has been able to build up
tain stockpiles of locally-
duced cereals and oils. Inst
of throwing these stockpiles
the common military hop
with British and American s
plies, however, the French s
plies are being held back,
sumably as relief to be adm
istered politically by his
officials.

Bulk of both military
civilian relief supplies
France has, of course, co
from the United States, incl
ing some $322,000,000 worth
lend-lease supplies for No
Africa. Even the arms sm
gled into the French und
ground by the British have b
American made. But there
been no thanks from de Ga
since lend-lease was first op
ed to his forces in July, 194
Whatever the French Comm
tee has bought and paid for
of its own revenues and s


HENRY
By
CARL ANDERSON
Registered U. S. Patent Office.

Rare, Night-Blooming Plant Flowers In Londoner's Garden

Scores of lemon yellow, single flowers with a pleasant odor unfolding from the tightest buds to blooms, some of them four inches across, all in about a minute, may be seen any night now in the garden of Rev. W. G. Colgrove, of 2 Christie street. The plant is the night-blooming evening primrose, a rare find, which may be the only one in the city. For those who take their botany seriously Mr. Colgrove, who does botanical classifying at the university, says the plant belongs to the onagraceae family, genera oenothera, species grandiflora.

The primrose is not one of those flowers that blooms for one brief spell and then is finished for another year, either. It flowers every night for about two weeks. So far, according to Mr. Colgrove's count, there have been 12, 30, 70, 69, and last night 58 blooms. 110 one night

Not hard to cultivate, the plant will grow in the poorest soil, but, naturally does better in good earth. Mr. Colgrove got the slip of his primrose from a neighbor last fall and it has grown to a height of four feet. He told The Free Press that he had had numerous requests for seeds but the plant will stop blooming if it is allowed to go to seed. Therefore, these requests cannot be granted until the end of the flowering season.

Best time for viewing the rarity is about 8.15 in the evening, said Mr. Colgrove. It usually starts to open about 8.45 and continues till aproximately 9.30, when the blooms die.

A MONUMENT TO CHRIST

For many years I've wished to do
A work of lasting worth for man;
And now, though late, here is a plan
To lay before the world and you.

To this great task I summon all
The spirits of poetic art,
And challenge both their brain and heart
To aid me in this urgent call.

But first let's try a lesser task,
Let's build a modern Ship of State
In all appointments up to date
Including lawns on which to bask.

And now let's build another one,
This time a space-ship grand indeed
Replete with wings for any speed,
All jet propelled, a paragon.

But these attempts are only for
A term of practice, just to see
How very skilled a man should be,
To undertake the larger chore.

The greater task's a monument,
To grace a garnished beauty plot,
And built upon the central spot
Of this broad northern conintent.

'Twill be in honor of the Christ,
But not a statue of his form;
'T will emulate the Christian norm
Because he kept with us a tryst.

We'll speed the call to every land
For architects of many a school,
And engineers with every rule
To plan an edifice so grand.

The builders too must love their craft,
Be highly skilled in massive art,
So each may do his perfect part
To cast and rear this giant shaft.

They'll lay foundations far around,
And sink them deep beneath the sand
To solid rock, where they will stand
When others crumble to the ground.

It must not be a pyramid,
Nor yet a carved sarcophagus
Of mammoth size but little use,
With marble models on its lid.

But it must be a towering pile,
Built on a vast inverted bowl
And cast in one gigantic whole,
To rise, at least, a statute mile.

'Twill be inclosed with ports of glass
In varied hues encased in beryl;
And gates of opalescent pearl
Surrounded in fine figured brass.

Around its base in chased design
A ring of porticoes will rest,
All built by nations to attest
Their true belief in Christ divine.

The base will be a polygon,
A side for each fine portico,
With steps of granite row on row
And cubes to stand grim lions on.

And in the garden all around,
The Tree of Life be ever green;
The Tree of Knowledge may be seen,
And Birds of Paradise be found.

The Rose of Sharon will be there,
And Lilies of the Field will blow,
The corn its silken tassels show,
With every vista passing fair.

And there will be a host of flowers,
With orchids blooming all the day;
And rhododendrons colored gay
Will glow beneath prismatic showers.

Some Ophir gold will be obtained,
And Spice of Araby to share
Its perfume with the vibrant air;
'Twill be a 'Paradise Regained'.

Within this castellated place,
The choicest art of Earth will come,
And high above, a Gothic dome
Will crown the vaulted central space.

Around the walls in crypts of gold
The sacred books of nations stand,
To tell how when a little band
They shattered superstition's hold.

And resting there beneath the dome,
In spacious niches all may see
The busts of many a hero be,
Who gave his life that this might come.

A MONUMENT TO CHRIST (CON'T)

And on their marble pedestals,
The famed immortals of each race
Will stand erect in sculptured grace,
With graven symbols on the walls.

'Twill not be on a mountain top
Where few can reach it without pain,
But in the centre of a plane
Where thousands may arrive and stop.

They'll come from many foreign lands
To see and feel its magic thrill,
Then bow and yield to Heaven's will,
And worship with uplifted hands.

While from within a voice proclaims
The merits of the Son of God;
The Branch that burst from Jesse's rod,
Redeemer, Saviour, Christ, his names.

And from its centre beams will play
Around its base in darksome night,
That pilgrims seeking for the light
May find it with the least delay.

Here many minds will congregate,
And gather here their studied tomes;
Here build nearby their modern homes,
And here the thought of Christ translate.

Here ancient songs till now uncouth,
And hymns and psalms will be revised,
And every cult be critici[illegible]
To find its fund of basic truth.

'Twill be religion's central place,
A New Jerusalem on Earth,
Where sinful souls may find rebirth,
And LOVE inspire the human race.

W. G. Colgrove.

12
nov. 8/43

MODELS THE UNIVERSE and ITS STARS CHARTS

In dealing with a very large subject like this, one cannot attempt more than a broad treatment with a few outstanding examples.

We are all aware that unaided eye observations are entirely inadequate in representing to the mind a three-dimensional space, and even when its power is increased by means of a telescope it is not much better. But with the use of a variety of accessory instruments and the development of mathematical calculations it is possible to approximate the actual shape of things.

The questions that we must try and answer tonight are:-
1. What is the probable extent of the Universe? 2. What are its constituents? 3. ~~W~~ What is known about our own Galaxy? 4. How is this information obtained? and 5. What is the nature of the stars?

1. The first question is the most difficult because we are not able to visualize the true form or dimensions of the Universe. There is no philosophy, no physics, no instrumental equipment and no mathematics quite equal to such an enormous and baffling task. But man will not be satisfied with a negative reply so long as there is a ray of light to guide his untiring search. Prof. Einstein has attempted an answer to the effect that space is a warped or bent continuum which curves back upon itself, in one sense, like a sphere whose surface is finite but unbounded. But we are not satisfied.

2. The second question asks about the constituents of the Universe and we are happy to say this is not so difficult, although we are by no means sure that we know every possible one. For far beyond our present reach which is about 500 million light years or some 3 sextillion miles there are, possibly, great numbers of objects whose nature and appearance we cannot even guess. Nevertheless we can tell a good deal about the ones we know.

Perhaps the largest constituent is gas, or gases of various kinds, in the midst of which we find numberless gaseous condensations which seem to be the probable birth places of stars. Mingled with this gas constituent there are vast accumulations of cosmic dust and dark material which eclipse millions of stars and affect the color of distant objects so that their sizes and motions are difficult or impossible to determine.

The various kinds of stars and their interesting combinations are perhaps the most important constituents and may be listed as follows:-

a. Evolving stars - those that present aspects which belong to initial stages of development.
b. Single stars - most of the stars have no friends, at least none close enough to dance with.
c. Multiple stars - most of which are called double-some in the line of sight, others in the form of physical binary systems. It is said that probably one fifth of all the stars have companions.
d. Variable stars - with short and long periods, some eclipsing, others in mutual revolution but not in our plane. Others again are single pulsating stars like the Cepheids, while still others are exploding stars like the Novae.
e. Moving stars - which travel together like the Pleiades or Hyades and are gradually altering the apparent shape and content of the constellations.
f. Streaming stars - composed of great groups from various constellations that partake of the rotation of the Galaxy.
g. Dwarf stars - including white dwarfs like the companion of Sirius.
h. Main sequence stars - including all medium stars like the Sun and Capella.
i. Giant stars - including supergiants like Antares.
j. Shell-forming stars - including the Novae and supernovae.
k. Planetary Nebulae and their central stars.
l. Irregular stellar clusters like the two Magellanic Clouds.
m. Globular star clusters like that beyond Hercules.
n. Spiral star systems like that beyond Andromeda.

Besides these or rather included among the spiral systems is our own Galaxy bounded by that vast circle, the periphery of the Milky Way. Just outside this there are the Globular clusters and within it there are stars, planets, satellites, planetoides, comets and meteors.

3. The third question regarding our knowledge of the Galaxy may be answered quite easily because of the persistent and painstaking work of many astronomers. The latest and best information has been supplied by our own Canadian astrophysicists at Victoria B.C. and states that its general shape and motion are in all probability similar to those spirals we see far out in space. Its orientation, appearence, dimensions, mass and rotation as well as the approximate number of stars, star groups, clusters and nebulous bodies within our reach are known. Its orientation is determined by its relation to the celestial equator and its great central line cuts the equator at right ascension 18h.42m. and 6h.42m. at an angle of about 62 degrees. Its north pole is beyond Coma Berenices and its south pole beyond Cetus. Its diameter is about 100,000 light years or 600 quadrillion miles and its thickness about 10,000 light years or 60 quadrillion miles. Its mass is said to be of the order of 200 billion suns which when multiplied by the mass of the sun, which is 2 octillion tons, makes its weight amount to the staggering number 4 with 38 ciphers tons. Its rotation at our position, 32,000 light years from the centre, is about 175 miles per second and yet it takes 220 million years to make one rotation. The number of stars has been greatly increased by recent photographic results and now instead of 30 billion, it has reached the 100 billion mark which includes 300 open clusters, nearly 100 Globular clusters and many moving groups as well as much gas and dark material.

4. The fourth question asks, what are the methods used in obtaining this information? and while I think the answer should hardly be part of this discussion I will give a few suggestions. The methods may be said to be largely covered by observation, measurement, calculation and deduction each assisted by a variety of accessory instruments such as the camera, the spectroscope and spectrograph, the interferometer, the thermocouple, the blink microscope and various star catalogues. The distances are found in several ways such as by the solution of triangles obtained by the ordinary surveyer's method; the solution of very small angles obtained by parallax determination; the comparison of spectroscopic absolute magnitudes, and the tedious examination of the variations of the light of Cepheid variable stars by means of the microscope on photographic plates. Star diameters are found with the interferometer attached to the 100 inch reflector at Mt. Wilson. Star temperatures are obtained by the bolometer and the thermocouple and the light intensity by the photometer and the radiometer. The most useful instrument of all is the spectroscope with its prisms which form the beautiful and revealing spectral bands and lines of individual stars. Often a large prism is attached in front of the objective of a telescope so that whole fields of star spectra are produced on a single plate for easy examination and comparison. Thus their positions, magnitudes, motions and colors can be judged and many interesting deductions made. To expedite this tedious work the stars have been carefully arranged according to their spectra in several classes as follows:-

O B A F G K M R N S * O be a fine girl, kiss me right now sweetheart.

5. The fifth question regarding the nature of the stars may now be answered by stating that all known stars are gaseous throughout but denser and hotter toward the centre and by giving a brief description of some outstanding examples of various kinds. But first may we express some thoughts about their evolution which, of course, is a different process from biological evolution. Perhaps the foremost expert in this field today is Professor Bethe of Cornell University whose theory is expressed in what is called the Carbon cycle which has attracted much attention. He says that in the mingled gas and dust of space a variety of motions are very gradually set up by light pressure and gravitation working in opposition. That, as time goes on, certain hydrogen protons penetrate atoms of carbon, oxygen and nitrogen to produce light rays and at the same time leave the carbon atom intact to be used indefinitely. The cycle begins when the central temperature of a star has reached about 15,000,000 degrees and is completed in about 50 million years only to be repeated until all the star's hydrogen is converted by this carbon catylist into helium. The question arises, when this has been done what will the star do, just suffer eternal refrigeration? Drs. Lyttleton and Hoyle of Cambridge University research foundation say NO! there is plenty of hydrogen in space for the stars to use and who knows but that more is in the making.

do last 3 lines of previous page

They say the sun itself sweeps up some 110,000 tons of it each second. Others, however, point out that this is not enough, for the sun, at present, is radiating 4,200,000 tons of light each second and to keep that up must transform 564 million tons of hydrogen into 560 million tons of helium each second of time. Evidently we shall have to wait for further study and calculation.

Let us now describe some characteristics of a few of the more important stars. We shall begin with the nearest and stay within a sphere of space of little more than 3000 lys. radius. With present equipment we can study stars out to the 21 magnitude, far beyond the limits of our system. It is said that it would take 100 million stars of the 21st magnitude to equal the brightness of 1 of the 1st magnitude. The apparent magnitudes are estimated on an arbitrary scale in which each is separated from the next by 2.512 times. The magnitudes increase as the brightness of the stars apparently decreases. The real or absolute magnitude is the brightness of a star when placed at a distance of 10 parsecs or 32.6 light years. At such a distance our sun whose magnitude is -2625 would be only 4.73 absolute magnitude. The actual diameters of the stars range from about one fiftieth of the sun to some 3000 times its diameter while their luminosities increase from one-thousandth of the sun to 600,000 times its brightness as in the S. Doradus twins 85,000 light years away in the Large Magellanic Cloud near the south pole of the sky.

In this same hemisphere our nearest star, a rather small one, is associated with a double star known as A and B of Alpha Centauri. All three stars are about 4.3 light years distant or 25 trillion miles. A and B revolve round each other in 80 years and, on account of the eccentricities of their orbits, the distance between them varies from 11 to 35 astronomical units, or from 1 billion 25 million to 3 billion 200 million miles - farther then Saturn and nearly as far as Pluto from the sun. The smaller faint companion mentioned above has been found to be nearer than Alpha and is called Proxima and makes the group a triple rather than a double star. Its diameter is about 200,000 miles and it revolves round the other pair in about a million years and its light is only one-fifteenthousandth of the sun.

Our mission of examination now takes us out to Sirius the great dog star, brightest in the sky except our sun. It is an A type double star only 9 light years away or about 54 trillions of miles. Its temperature is 10,700 degrees C like the sun and it shines with 39 times the sun's light. Its diameter is 1.8 times the sun or 1½ million miles. Its mass is about 2½ times the sun and its surface gravity is 28 times that of the earth and like the sun. The companion of Sirius is a faint, small, heavy star, the first white dwarf found. Its diameter is only 30,000 miles, like the planet Uranus while its mass is almost equal to the sun and its surface gravity is 53,000 times that of the earth so that 1 pound of it would equal 10 tons here. It revolves round Sirius in about 50 years and is now apparently nearing Sirius and will be out of sight during 1944.

From Sirius we speed across to Cygnus to examine No. 61 which is one of our nearest doubles and like Alpha Centauri has been found to be triple. Its parallax is was the first to be obtained and its distance determined. It is about 10.8 light years away and the two original components revolve round each other in 720 years at a distance of 10 billion miles. Their light is only one twentieth and one fiftieth of that of our sun. But the main reason for our visit is the existence of a prodigy, unique up to date, in the form of what appears to be the first planet discovered outside the Solar family. It is a huge globe of dark material revolving round one of the pair in 5 years at a distance of 65 million miles. Its mass seems to be about 16 times as great as our planet Jupiter and so the world has been thrilled again by an unusual astronomical discovery and much time and study are being spent upon it.

Our next stop will be at Vega in Lyra. This is a single fellow too brilliant to be bothered with a companion. It is another A type star of high temperature some 27 light years away and very steady in his habits - such folks, you know, do not get much publicity, so let us just take a passing glance at his two faithful attendants, the famous double suns and then go on our way.

From Vega we fly to Arcturus another single star of K type and therefore cooler. Its distance is 33 light years or 198 trillion miles and its diameter is about 22 times the sun or 25 million miles. It gives about 100 times as much light as the sun

-although its temperature is only 4230 degrees C.

Next we shall call on Capella, the Kid star, of G type like the sun but double, with a temperature like the sun. It is 42 light years away or 252 trillion miles and has a diameter of 13,800,000 miles or 16 times the thickness of the sun. It gives about 150 times the sun's light. Its little companion revolves round it in 104 days at a distance of 50 million miles but it is unimportant.

Now let us go over to Castor a double A type star. This, of course, is one of the twins in Gemini which appears single to the unaided eye but when resolved in the telescope becomes an excellent double revolving round each other in 340 years at a distance of 7 billion 440 million miles from each other. But spectroscopic studies have shown that each one is a binary system, the fainter pair revolve in a period of 3 days and the brighter pair in a period of 9 days. Besides these pairs there has been found a very faint star revolving round the brighter pair and now it is known to be a binary also. We have, then, six stars where we see only one with the unaided eye.

We now go on to the great giant Aldebaran a fine single K type star slightly reddish in color, similar to Antares but always higher in the sky and in the Hyades group. It is a rather cool star with a temperature of only 3300 degrees F or only half as hot as the sun. Its distance is 53 light years or 318 trillion miles and its diameter 35 times the sun or some 30 million miles. It would require a battery of 91 suns to equal its light.

Our next visit will be paid to Mizar in the big dipper handle, the first combined visual and spectroscopic binary found. It is like Sirius, only it is about 9 times as far away and its companion is not an abnormal mate. Its distance is 78 light years and its diameter is 1,600,000 miles or about twice that of the sun. Its density is one third of the sun and its mass 4 times as great while it shines with 30 times the sun's light. Its little companion revolves round it in 20½ days at a distance of 22 million miles and on closer examination proves to be a binary in its own right. And it is interesting to find that Alcor, its naked-eye companion, is also a binary system. Here we have 5 stars where many of us see but one.

From Mizar we take off for the constellation Cassiopeia where Gamma is a very peculiar star. It is a true double in that the components are still connected like the bulbs of an hour glass with the great gaseous envelope wrapped round both of them. It is 93 light years away and has a diameter 8 times the sun or 6 million 900 thousand miles which, as it revolves, seems to vary from 8000 to 18000 times the sun and at the same time its temperature varies from 9000 degrees to 13000 degrees . Its mass is 12 times the sun. When they let go will there be a Solar system?

The next interesting stopping place will be the Demon Star Algol in Perseus. This is a B type eclipsing binary whose eclipses take place every 2 days 20 hrs. 49 min. Eclipsing stars appear to vary in brightness but they are not proper variable stars which are almost always single. This blinking demon is 99 light years away and its diameter is 2,700,000 miles while its density is only about ¼ of the sun. The companion's diameter is 3,200,000 miles and its density and light are equal to the sun. The distance between them is about 3 million miles and they appear to lose about four fifths of their light during the height of each eclipse. It is agreed that there are probably 2 or 3 would-be interlopers lurking around but they have not yet been observed.

We shall now make a dash over to Spica in Virgo, a magnificent blue B type binary , young and vigorous and with a temperature of 20,400 degrees. Its distance is 120 light years or 720 trillion miles while its diameter is not yet known.. The masses of the components are 9.6 and 5.8 times the sun. They revolve round each other at 1.2 miles per sec. in only 4 days at a distance of 11,000,000 miles.

From Spica we rush across the pole to Cetus where we find Mira, the wonder star, an M type variable whose actions are not yet fully understood. Its distance is 250 light years or 1 quadrillion 500 trillion miles and its diameter 397 million miles. It seems to be a single pulsating star but with an irregular rhythm. Its temperature varies from 1900 degrees to 2600 degrees and its maximum brightness reaches 180 times that of the sun. The variation takes 330 days and covers over 6 magnitudes from the 2nd to the 9th. Mira is probably a proper long-period variable without a companion.

And now, as fast as light, let us turn back across the sky to the constellation Scorpius where the great red supergiant Antares awaits us. Here is another M type binary star at a distance of 250 light years, the same as Mira, and with a diameter only a little less than hers, or about 330 times the sun which makes it 285,000,000 miles. To match its huge bulk we should need 36 million suns but its mass is only 30 times that of the sun while its density is but one-one millionth of the sun. It shines with a brilliance 1900 times the sun. Its companion is very small and little is known of its characteristics.

Once more we cross the sky to visit the mighty hunter Orion and examine two of his brilliants. The first is Alpha named Betelgeuse another M type reddish single supergiant. It appears to pulsate like Mira. Its distance is about 300 light years or 1 quadrillion 800 trillion miles and its average apparent diameter is about 400 times the sun or 345 millions of miles. Its temperature is low, only 3200 degrees but its light is 2000 times that of the sun. While we are in this constellation let us slip over to Rigel a brilliant single blue B type giant. Its distance is more than twice as far as we have come already or 543 light years, and its diameter about 30 million miles. Its temperature stands at about 12,300 degrees and its luminosity at about 15,000 times the sun.

From Orion we fly back again to Auriga to visit Epsilon with its enormous faint companion at about the same distance as Rigel, 543 light years. This companion steals the show, for it is a dull, vast, invisible globe whose diameter is said to be 3000 times as great as the sun's which would make it some 2 billion 600 million miles across. Its density, however, is only one-millionth of our atmosphere and it takes 27 years to revolve round its primary. This is the largest body known in the Galaxy but its mass is only 30 times that of the sun. This peculiar star would fill the space between the sun and Neptune. V V Cephei is another similar stellar oddity whose distance is about 6500 light years. The smaller star of this pair is said to have a diameter of 19,000,000 miles and a mass of 40 times the sun. The larger one has a diameter of 2,500,000,000 miles and a mass of only 57 suns but its luminosity equals 250,000 suns, and its volume is about 27 billion times the sun.

We have already mentioned sufficient stars to indicate their nature but there is one more variety called Novae which appear to expand and form enormous shells of gas far out from the stars themselves. We shall list only a few, such as one in Perseus in 1901, the one in Aquila in 1918, the one in Cygnus in 1920, the one in Hercules 1934, the one in Lacerta in 1936 and the one in Puppis in 1942.

The greatest Nova or exploding star on record was first seen in China back in 1054 A.D. and it is said that its maximum brilliancy must have been 100 million times our sun. Today the Crab nebula in Taurus stands almost exactly on the same spot, as it were, and may have been formed from the expanded shells of that Nova.

And finally, where are we in this welter of stars? We are with our sun wherever it is. Let us examine our model of the Galaxy and, by noting the following instructions find our place among the stars.

Revolve the tiny earth until it arrives abreast of December 21 on the ecliptic circle, then rotate the earth until the black spot that represents the horizon plane faces the sun, then turn the whole instrument until the earth's north pole points to Polaris and note the following;-

(a) At midday on December 21, as viewed from the earth, the sun appears at the winter solstice directly south on the ecliptic,which is then below the celestial equator about 23½ degrees.

(b) At midday also the sun is between the earth and Sagittarius, while the latter is between the sun and the Galactic centre which lies some 32,000 light-years beyond.

(c) At midday too the Milky Way lies eastward about 28 degrees from the celestial pole and arches from N.N.E. to S.S.W. cutting the celestial equator at 6 hours, 42 mins and 18 hours, 42 minutes close to the solstices.

(d) At midday again the vernal equinox is eastward and the summer star Vega is almost overhead.

(e) If we rotate the earth, and imagine ourselves at the centre of the horizon spot, we shall find that at 5 hours and 21 hours on the celestial equator the Milky Way appears nearly parallel to our meridian while at 12 hours it is nearly parallel to our horizon plane.

Psalm 104:24 "O Lord, how manifold are thy works, in wisdom hast thou made them all."

Romans11:33 "O the depth of the riches both of the wisdom and knowledge of God! how unsearchable are his judgments and his ways past finding out."

# # # # # # # # # # #

This material was assembled by W. G. Colgrove from publications mainly of the past 5 years.

A PLACE in the Sun

AND

POEMS

BY ONE WHO TRIED

INSPITE OF THE CLOUDS.

I N D E X

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ASTRONOMERS

I

ASTRONOMERS

NAMES	INITIALS	LIFE-SPAN
Auwers	Arthur	1838-
Azzarkal		-1000-
Baade	W.	
Babcock	H.D.	
Babinet	Horace	-1861-
Backhouse		
Backlund	J.O.) same	1846-
Backlund	O.) man	1884-
Baikie	J.	
Bailey	S.I.	1854-
Baily	F.	-1840-
Bailly	J.S.	1736 - 1793
Baize		
Baker	R.H.	
Bakhuyzen		
Balazo	P.	
Baldet	F.	
Baldwin	R.	-1852-
Ball	R.S.	
Balmer		
Bancs		
Bappu	M.H.	
Barkowski		-1851-
Barlow and Bryan		
Barnard	E.E.	1857 - 1923
Barney	Ida	
Barringer	D.M.	
Barton	S.G.	
Barton	W.H.Jr.	
Bauschinger		
Baxendall		-1866-
Bayer	J.	1572 - 1625
Beals	C.S.	
Beauchamps		1752 - 1801
Becker	W.	
Beer and Madler	W.	
Behaim		1459 - 1506
Bejerknes		-1926-
Bell		
Belopolsky	A.A.	
Belopolsky	M.	-1908-
Belyavski	S.	
Benzenberg		1777 - 1846
Berry		-1898-
Bergstrand		
Berman	L.	
Bessel	F.W.	1784 - 1846
Bethe	H.A.	
Bey	Ulugh	1394-
Bickerton		-1915-
Bidelman	W.	
Biela	von W.	1782 - 1856
Biermann		
Bigourdan		-1893 - 1918-

NAMES	INITIALS	LIFE-SPAN
Binet		1786-1856
Biot	J.B.	1774-1862
Birmingham		-1866-
Blackett		
Blazhko		
Bobrovnikoff	N.T.	-1940-
Bode	J.E.	1747-1826
Boeddicker		-1884-
Boguslawski		
Bohr	N.	
Bok		
Bok Mrs.		
Bolton	S.	
Bond son	G.P.	1826-1865
Bond dad	W.C.	1789-1859
Boon		
Borda		1733-1789
Borelli	G.A.	1608-1679
Boss	E.J.	
Boss	Lewis	1846-1912
Bougnet	de la Grye	-1882-
Bouguer		1698-1758
Boulliaud		-1667-
Bourgeois		
Bourget		
Bouvard		-1805-
Bovart		1767-1843
Bowditch		1773-1866
Bowen	I.S.	1927-
Bower		
Boyce		-1940-
Boyd Miss	C.	
Boyle		
Boys	C.V.	-1890-
Bradley	James	1693-1762
Brahe	Tycho	1546-1601
Brandes		-1798-
Braun		-1872-
Brayley	E.W.	-1864-
Bredikhine	T.	
Brester		-1892-
Brinkley		
Brooks	W.R.	-1883-
Brorsen		
Brewster		-1832-
Brouwer	Dirk	
Brown & Shook	E.B.	-1933-
Brown	E.W.	
Brunner		
Brunnow		
Brunowski		
Bryan & Barlow		
Bryant		-1907-
Buchanan		-1904-

NAMES	INITIALS	LIFE-SPAN
Buchholtz		-1828-
Buffham		-1870-
Buffon		-1778-
Bugge		1740-1815
Buisson	M.M.	
Bunsen	R.W.	1811-1899
Burnham	S.W.	1838-
Burns	Keivin	
Burton	H.E.	-1873-
Burwell		
Butterton		-1932-
Cacciatore		1815-1889
Cagnoli		1743-1816
Callandreau		
Calvert	Mary R.	
Cameron & Millikan		
Camm	G.L.	
Campani		-1664-
Campbell	Leon	1881-
Campbell	W.W.	1862-
Cannon	Annie J.	1863-1941
Carlini		-1821-
Carpenter	James	-1860-
Carrington	R.	1826-1875
Carroll		-1933-
Caruso		
Cassigrain		
Cassini	G.D.	1625-1712
Cassini son	J.J.	1677-1756
Cassini grandson	J.D.	1748-1845
Cavendish	Henry	1731-1810
Celoria	G.	
Celsins	A.7	1701-1744
Cerulli	V.	
Chabert		1723-1805
Chacornac		-1865-
Chairamonti		1565-1652
Challis	J.	
Chamberlin	T.C.	1843-
Chambers	G.F.	-1909-
Chandler	S.C.	1846-1913
Chandra	R.G.	
Chandrasekhar	S.	
Chant	C.A.	
Chapman		
Chappell	J.F.	
Charlier	C.E.	
Charlois		-1892-
Chauvenet		-1893-
Cherrington		
Chladni		-1794-
Christie	W.H.	
Clairant	A.C.	-1742-
Clarke	Alvin G.	1832-1896
Clarke Miss		1902-

NAMES	INITIALS	LIFE-SPAN
Clarke	Col	1902-
Clausen	Thos.	-1831-
Cleomedes		c.200
Clerihew		-1843-
Clerke	Agnes	
Coblentz	W.W.	1873-
Coman	V.K.	-1944-
Combariati	Tecla	1855-
Comstock	G.C.	
Common	A.A.	1841-1903
Copeland	R.	1837-
Copernicous	N.	1473-1543
Cornu		1883-
Cotes		1682-1716
Cottington		
Cowell	R.H.	-1905-
Cox	R.G.	
Crabtree		1640-
Crawford		-1930-
Crew	H.C.	-1887-
Crommeline	A.C.	1865-
Cruls	M.	1882-
Cuffay	J.	
Cunningham	L.E.	
Curtis	H.D.	1872-
Curtiss	R.H.	
Damoiseau		-1920-
Daniel	Z	
Danjon	A	
d'Arrest	H.L.	-1851-
Darwin	G.H.	1845-1912
Daubree		1885-
d'Autersche		
Davidson	C.R.	
Davidson	George	1825-
Davis	W.M.	1850
Davis	H.S.	
Dawes		-1851-
Dawson	E.H.	
d'Azambuja		
DeBall		-1882
Delambre	J.B.	1749-1822
Delaunay	C.E.	1816-1872
Delavan		
de la Rue		
De Louieville		-1715-
Delisle		1688-1768
De Long		-1870-
Delporte	E.	-1835-
Dembowski	E.	-1850-

NAMES	INITIALS	LIFE-SPAN
Denning	W.F.	1848-
Denning	E.J.	
Denza	P.F.	-1872-
Derham		1715-
de Roy	Felix	
De Plantade		-1736-
Descartes	Rene	1596-1650
de Sitter		
Deslanders	H.	-1890-
Detre	L.	
Deutsch	A.N.	
de Vico	F.	-1840-
Dimitroff	G.Z.	
Dingle	H.	-1924-
Dionis		1734-1794
Dneprovsky	N.I.	
Doberck		-1882-
Doerfel	G.S.	1643-1688
Doig		-1927-
Dollond	John	1706-1761
Donaldson	P.H.	
Donati	G.B.	1826-1873
Donner		
Doppler	C.	1803-1853
Douglass	A.E.	1867-
Downing	A.M.W.	-1870-
Draper	A.L.	
Draper	Henry	1837-1882
Draper	J.W.	
Dreyer	J.L.	1852-
Dugan	R.S.	
Duhem		
Dulong & Pattit		
Duncan	J.C.	
Dunham		
Dunham	Theo. Jr.	
Dunkin	Ed.	-1860-
Duner	N.C.	-1889-
Duponchel		1875-
Dustheimer	O.L.	
Dyson	F.W.	
Easton		
Eckert	W.J.	
Eddington	A.S.	1882-1944
Edlen	Bengh	
Edmondson	F.K.	-1943-
Edmondson	E.	
Egoroff		-1883-
Eimmart	G.C.	1638-1705
Einstein	A.	1879-
Elger	T.G.	-1895-

NAMES	INITIALS	LIFE-SPAN
Elkin	W.L.	
Ellerman	F.	
Ellicott	And.	1754-1820
Elvey	C.T.	
Elvins		-1879-
Enche	J.F.	1791-1865
Enebo	S.	
Englemann	Newcomb	-1871-
Eratosthenes		275-194 B.C.
Ericcson		-1872-
Erman		-1839-
Erro	L.E.	
Espin	Rev. T.E.	-1910-
Eudoxus		407-356 B.C.
Evans	E.D.	
Evans	J.	
Evershed	J.	1864-
Fabricius	David	1564-1617
Fabry	John	-1610-
Farnsworth	Alice	-1940-
Fath	E.A.	1880-
Fauth		-1907-
Fedynsky	V.V.	-1941-
Faye	H.A.	1814-
Fayet		
Feilitsch		-1852-
Fenner	C.	
Fenton	Carrol Lane	
Ferguson	Jas.	1710-1776
Ferrel		-1858-
Ferrer		-1876-
Fetlaar		
Finlay		-1806-
Finsen		
Finsler		
Fisher	Clyde	
Fisher	W.J.	
Fizeau	H.L.	1819-1896
Flammarion	C.	1842-1925
Flaugergues		-1811-
Fleming	W.P.	
Fleming	Mrs. M.	-1891-
Fontana	F.	-1643-
Forbes	G.	-1880-
Forbes	J.D.	
Foster		
Fotheringham	J.K.	-1870-
Foucault	J.B.	
Foucalt	L.	1819-1868
Fowle		
Fowler	A.	-1920-
Flamsteed	John	1646-1719

NAMES	INITIALS	LIFE-SPAN
Fox	Philip	1878-
Frankland and Lockyer		
Franks		-1877-
Fraunhofer	J.	1787-1826
Fraundlick		
Fried	Hans	
Friend	C.L.	
Fritz	H.	1860-
Frost	E.B.	1866-
Frothingham		
Furness		-1915-
Gale	H.G.	
Galileo	G.	1564-1642
Galle	J.G.	1812-1910
Gallo	Joaquin	
Galloway		-1847-
Gallus		166-
Gambart		1800-1836
Gamow	Geo.	
Gaposchkin	S.	1879-
Gaposchkin	Mrs. S.	
Gardner	I.C.	
Gascoigne	W.	
Gauss	C.F.	1777-1855
Gauthier		-1840-
Gaviola	Enrique	-1940-
Gay Lussac		
Geddes	M.	
Gerasimovich	B.P.	
Ghiyas ud Din	Jamshid	
Gibcobini		-1905-
Gibson	F.M.	
Giclas	H.L.	-1944-
Gill	D.	1843-
Glasenapp		-1887-
Gleisher	Jas.	1809-
Gledhill		-1870-
Goddard		
Godin	Louis	1704-1760
Goldberg	Leo	
Goldschmidt	H.	1802-1866
Gomi	K.	
Goodacre	Walter	-1931-
Goodricke	J.	1765-1786
Gordon	Kath.	
Gore	J.E.	-1885-
Gould	B.A.	1824-1896
Graef	Carlos	
Graff	K.	-1929-
Graham		-1848-
Grant	R.	-1852-

NAMES	INITIALS	LIFE-SPAN
Gray & Wilson		
Green	N.E.	-1877-
Green	W.K.	
Greenstein	J.L.	
Gregory	Jas.	-1675-
Groombridge	S.	
Guillemin	A.	
Guinand	P.L.	
Gully	L.	
Gunter	Edmund	1581-1626
Gutenberg		
Guthnick	P.	
Gylden	J.A.	1841-1896
Gyllenberg		-1920-
Hadley	J.	-1744
Hagen	J.G.	
Hale	G.E.	1868-1938
Hall	Asaph	1829-1907
Hall	A. Jr.	
Hall	J.S.	
Hall	Max	-1884-
Hall	R.G.	
Halley	Edmund	1656-1742
Halm	J.	1911-
Hamilton	W.R.	1805-1865
Hamy		-1900-
Hansen	P.A.	1795-1874
Hansen	J.M. (Miss)	
Hansteen	C.	1784-1873
Hardcastle	J.A.	-1914-
Harding	A.M.	
Harding	C.	1765-1834
Harding	J.	-1304-
Hargraves	-1920	-1920-
Harkness	W.	-1866-
Harper	W.E.	1878-1940
Harrington	M.W.	
Harriott	T.	1560-1621
Hartmann	J.	
Hartmann	W.	
Hartwig		-1885-
Harvelic	D	
Harwood	Miss	
Hastings		1881-
Hase		
Hasselberg		-1892-
Hay	W.T.	-1933-
Hayford		
Heard		
Hecker		

NAMES	INITIALS	LIFE-SPAN
Heckmann	O.	
Heger	Miss	
Heiss	E.	
Hell	Max.	1720-1792
Helmholtz	H.L.	1828-1894
Helweg	J.F.	
Hencke	I.	1793-1866
Henderson	T.	1798-1844
Henroteau		-1928-
Henry	Paul	-1845-
Henry	Prosper	-1884-
Hepburn	P.H.	
Herget	Paul	1908-
Herrick		1845-
Herschel	Carolina	1750-1848
Herschel	John	1792-1871
Herschel	William	1738-1822
Hertzsprung	Ejnar	-1922-
Herz		
Hevelius		1611-1687
Heyl	Paul	
Hill	G.W.	
Hiltner	W.A.	
Hind	J.R.	1823-
Hinks		
Hipparchus		180-110 B.C.
Hirayama	K.	
Hirn	G.A.	
Hirose	M.	-1865-
Hock		
Hoffleit	Dorrit -	
Hodgson	Highgate	1859-
Hoffmeister	C.	
Hogg	F.S.	
Hogg	Mrs. H.S.	
Holden	E.S.	1846-
Holmes	E.	-1892-
Holwarda	J.R.	-1638-
Homann	M.	-1885-
Horn d'Artirro		-1926-
Hooke	R.	-1666
Hophine		1839
Horrebow		
Horrocks		1620-1641
Hough	G.W.	-1909-
Hough	S.S.	-1909-
Houzeau	M.	-1884-
Howe	H.A.	
Hubbard		-1843-
Hubble	E.P.	1889-
Huffer	C.M.	-1940-
Hufnagel		
Huggins	W.	1824-
Humason	M.L.	
Humbolt	F.H.	

NAMES	INITIALS	LIFE-SPAN
Humphreys		-1895-
Hunt	Sterry	
Hussey	W.J.	
Huth		1805-
Hutchins		-1887-
Huyghens		1629-1695
Hynek	J.A.	
Ibn Jounis		cir. 1000 A.D.
Ideler	C.L.	1766-1846
Innes	R.T.	
Ivanoff	A.A.	
Jacchia	Luigi	
Jackson	J.	-1944-
Jacobi	H.	
Jansky		
Janssen	P.J.	1824-1907
Jeans	J.H.	1877-
Jeffreys	H.	1891-
Jenkins	Louisa F.	
Jessup		
Jewell		
Johnson		-1836-
Johnson & Pogson	M.J.	
Johnson	W.A.	-1937-
Jonckheere	R.	
Jones	H.S.	-1923-
Jones	Miss R.	
Jordan	F.C.	1865-1941
Joy	A.H.	1882-
Kaiser	F.	-1862-
Kamienski		
Kant	I	1724-1804
Kayser	H.& Runge C.	-1890-
Kapteyn	J.	1851-1922
Keeler	J.E.	1857-1900
Keenan	P.C.	
Kemour		
Kempf		
Kenton	Edna	
Kepler	J.	1571-1630
Kidinnu		
Kiess	M.	
King		
King	E.S.	
Kirch		-1721-
Kirchhoff	G.R.	1824-1887
Kirkwood	D.	1814-1895
Klein	H.F.J.	-1878-
Klepstra		
Klinkerfues	W.	-1872-
Klugel		
Knight		-1917-
Kohlschutter	A.	
Komendantoff		

NAMES	INITIALS	LIFE-SPAN
opal	Z.	
opff		-1929-
ramer		-1923-
rat	W.	
reil		-1841-
reutz		-1861-
rogdahl	W.	
rueger		-1852-
uiper	G.P.	
ukarkin	B.W.	
ulik	L.A.	
unowsky		-1822-
ustner	F.	-1884-
abon	E.	
acaille		1713-1762
alande	J.	1732-1807
amaitre	L.G.	
ambert	J.G.	-1762-
amont	J	-1851-
amp	J.	-1887-
ampland	C.O.	1873-
and	G.	
ane		-1870-
angdon		-1873-
angier		1812-1872
angley	S.P.	1834-1906
a Paz	L.	
aplace	P.S.	1749-1827
assell	W.	1799-1880
au	H.E.	
augier		
avdovsky	V.V.	
eavitt	Miss H.S.	1921-
ebedew		-1892-
e Chatetier	M.H.	-1892-
edger		-1879-
ee	O.J.	
eet	L.D.	
e Gentil		
e Monnier		1715-1799
eonard	L.	
escarboult		
e Sueur		-1869-
euschner	A.O.	1868-
everrier	U.J.	1811-1877
ewis	Miss I	
exell		-1770-
ifshits		
illey	A.E.	
indblad	B.	
indemann	F.A.	
indley	W.M.	
insley	E.G.	
isting	J.B.	-1873-
ittrow	Karl	1811-1877

NAMES	INITIALS	LIFE-SPAN
Livlander		
Ljunberg		-1802-
Lockwood	Miss M.	
Lockyer	J.N.	1836-1920
Loewy		-1891-
Lohrmann	W.G.	-1824-
Lohse	J.G.	
Longomontanus		1562-
Loomis	Alf.	-1928-
Lorentz	H.A.	
Loreta	E.	
Lowell	P.	1855-1916
Lowey and Puiseau	M.	
Lubbock	J.W.	1803-1865
Ludendorff	H.	-1928-
Lundmark	K.	
Lunt		-1930-
Luyten	W.J.	
Lyman	S.	-1866-
Lyot	B.L	
Lyttleton	R.A.	
Macdonnell	J.	-1874-
Macelwane	J.B.	
Machain		1744-1804
Maclaurin		-1737
Maclear	T.	-1843-
Maclear	Admiral	-1871-
Macpherson	H.	
MacRae	D.A.	
Madler	J.H.	1791-1874
Maggini	M.	
Maghull		-1886-
Malmquist		-1920-
Manfredi		1674-1739
Mann	N.M.	-1883-
Mann	W.	-1859-
Maraldi	G.	-1724-
Marins	Simon	1570-1624
Markowitz	W.	
Marshall	Roy K.	
Martin	E.G.	
Martinez	Max	
Maskelyne	N.	1732-1811
Maunder	E.W.	-1924-
Maupertuis		1798-1759
Maury	Miss A.C.	1866-
Maury	Leut.	-1846-
Maxwell	A.D.	
Maxwell	J. Clerk	1831-1879
Mayall	Mrs. M.W.	
Mayall	N.U.	
Mayer	C.	
Mayer	J. Tobin	1723-1762
Mayer		-1848-

NAMES	INITIALS	LIFE-SPAN
McCrae		
McCuskey	S.W.	
McKellar		
McLaughlin	D.B.	
McNally	Paul	
Mehlin	Theo. G.	
Melloni		-1846-
Melotte		
Mendenhall	T.C.	
Menzel	D.H.	
Merion	de Saussure	-1932-
Merrill	P.W.	1887-
Merser		
Messier	C.	1730-1718
Meyer	E.F.	-1880-
Michell	John Reo.	-1767-
Michelson	A.A.	1852-
Miller	J.A.	1859-1914
Millikan	R.A.	1868-
Millman	P.M.	
Milne	E.A.	
Minchin	G.M.	
Mineur		
Minkowski	R.	
Mitchel	O.W.	1809-1862
Mitchell	Maria	1818-
Mitchell	S.A.	1874-
Moffatt	M.	
Mohler	Orren	-1895-
Mohn		-1860-
Molesworth		
Moll		-1832-
Moller	D.M.	1830-1896
Monck	W.H.S.	
Monk	W.H.	1892-
Montaigne	M.	1716-1785
Montanari	G.	1633-1687
Moore	Miss Charlotte	
Moore	J.H.	1878-
Morehouse	D.M.	1877-1941
Morgan	H.R.	
Morgan	W.W.	-1940-
Morley	E.W.	1838-
Morstadt		-1837-
Mouchez		-1892
Moulton	F.R.	1872-
Mowbray	A.G.	
Muller & Kemfp		
Munch		-1909-
Myer		-1869-
Naegamvala		-1891-
Nasmyth	Jas.	
Nassau	J.J.	

NAMES	INITIALS	LIFE-SPAN
ilson		
ison		-1880-
ujmin		
wall	F.	
wall	R.S.	-1889
wcomb	S.	1835-
wton	H.A.	1830-1896
wton	I.	1642-1727
chol	J.P.	
chols	E.F.	1869-1924
cholson	J.W.	
cholson	S.B.	1891-
collet	J.N.	1786-1843
elson		
esse		
eston	M.	-1880-
ninger	H.H.	-1937-
ssen	J.J.	
ble	W.	-1864-
lan	Jas.	
rdmann		-1909-
rthcott	Miss R.J.	
rton	A.P.	
rton	W.A.	-1844-
land	A.A.	
man		
Keefe	F.	
ulick		
bers	H.W.	1758-1840
cott	W.T.	
ivier	C.P.	
msted	D.	-1833-
rt	J.H.	
ik	E.	
polzer	M.E.	-1893-
polzer	T.R.	1841-1886
iani		1752-1832
erma	Miss L.	
lisa	J.	-1925
lmer	H.K.	
neth	F.	
nnekoek	A.	
pe	C.F.	-1884-
raskevopoulos	L.S.	-1925-
rengo	P.P.	
rkhurst		1908-
storff & Buchholtz		-1828-
wling	Jesse	
earce	J.A.	
ease	F.G.	1881-
eck	B.M.	-1920-
eirce	Benj.	

NAMES	INITIALS	LIFE-SPAN
Peiresc	N.C.	1560-1637
Peltier	L.C.	
Pentecoulant		-1829-
Peripelkin	E.J.	
Perrine	C.D.	1867-
Perrotin	H.	
Perrotin	J.	1845-
Peters	C.A.F.	-1842-
Peters	C.F.W.	1806-1880
Peters	C.H.F.	1813-1890
Petrie	R.M.	
Petrie	W.	
Pettit	Edison	1889-
Peytal	Abbe	-1842-
Pfund		-1913-
Phillips	T.E.R.	1916-1943
Piazzi	G.	1746-1826
Picard	Jean	1620-1682
Piccolomini	Alex	-1559-
Pickering	E.C.	1846-1919
Pickering	W.H.	1858-1937
Pierce	J.A.	
Pierce	N.L.	
Pigott		
Pingre		1711-1796
Pirsson	L.V.	
Pishmish	Miss M.	
Pitman	J.H.	
Planck	Max	
Plaskett	H.H.	
Plaskett	J.S.	
Plato		429-348 B.C.
Plucker		-1859-
Plummer		-1883-
Pogson		1829-1891
Pokrovsky		
Popper	D.M.	
Pond	J.	1767-1836
Pontecoulant		-1829-
Pons	J.L.	1761-1831
Poor	C.L.	-1880-
Porter	J.G.	
Porter	R.W.	
Pouillet		-1838-
Poynting		-1891-
Prager	R.	
Prazzi	G.	1746-1826
Prentice	F.P.	
Prior	G.T.	
Pritchard	C.	-1888-
Pritchett	C.W.	-1878-
Pritchett	H.S.	
Proctor	M.	
Proctor	R.A.	1837-1888

NAMES	INITIALS	LIFE-SPAN
Ptolemy	C.	100-170
Puiseux	P.	
Purbach		1423-1461
Pythagoras		569-490 B.C.
Quetelet		-1836-
Rabe		-1936-
Racillas	F.	
Racillas	Mrs.	
Ranyard		-1892-
Rayet		-1867-
Reed		
Regiomontanus		1400-
Reich		-1840-
Reid	W.	-1920-
Reinmuth	H.	-1937-
Reinwaldt		
Renz	H.	-1891-
Respighi	L.	-1869-
Reuyl	D.	
Reynolds	J.M.	-1936-
Riccioli	G.B.	1598-1671
Ricco	A.	-1883
Rice	H.S.	
Richardson	R.S.	
Richenbah		
Richer		-1672-
Richtmyer	F.K.	
Ritchey	G.W.	1864-
Rittenhouse	David	1732-1796
Ritter	A.	-1883
Roberts	Isaac	1829-1904
Roberts	Mrs.	-1942
Roberts	W.O.	
Roche	E.A.	
Rodinger		
Roemer		1644-1710
Rosenberger		
Rosetti	F.	
Ross	F.E.	
Rosse	W.P.	1800-1867
Rosse		-1869-
Rosseland	S.	-1936-
Rossiter	R.A.	
Rowland	M.A.	
Royds		
Rufus	W.C.	
Rumker		-1822-
Runge & Kayser	C.	-1890
Russell	H.N.	1877-
Russell	H.C.	-1876-
Rutherford		
Rutherfurd	L.M.	

NAMES	INITIALS	LIFE-SPAN
Sabine	Sir Ed.	1852-
Safford	T.H.	1830-
Saha	M.N.	
Saiverthal		-1888-
Sala'h ud Din Musa		
Sampson	R.A.	1922-
Sanford	R.F.	1883-
Saunder	S.A.	
Savary		-1827-
Schaeberle	J.M.	-1893-
Schalen		
Scheiner	C.Father	1575-1650
Scheiner	J.F.	-1898-
Schiaparelli	G.V.	1835-1910
Schiller	K.	1871-1943
Schilt	Jan.	-1944-
Schlesinger	F.	1871-
Schlesinger	W.	
Schmidt	J.F.	-1866-
Schoch	K.	
Schonfeld		-1852-
Schroter & Lilunthal	J.H.	1745-1816
Schuchert	C.	
Schumacher	H.C.	1780-1850
Schumann	Victor	-1892-
Schuster		-1886-
Schwabe	S.H.	1789-1875
Schwartzschild	K.	
Schwassmann	A.	
Schweyder		
Scott	R.M.	
Seares	F.H.	1873-
Secchi	P.A.	1818-1878
See	T.J.J.	
Seeliger	H.	1849-1888
Seidel		
Serafimov		
Serviss	G.P.	-1896-
Seyfert	C.K.	
Shackelton	W.	
Shajn		
Shane	C.D.	
Shapley	H.	1885-
Shaw	K.	-1933-
Sherman	O.T.	
Shock		
Short	J.	-1748-
Siedentopf		
Simms		-1832-
Sitterly	B.W.	
Sitterly	Mrs.	
Skellet	A.M.	

NAMES	INITIALS	LIFE-SPAN
Skilling	W.T.	-1942-
Slipher	E.C.	1883-
Slipher	V.M.	1875-
Slocum	F.	
Smart	W.M.	
Smiley	C.H.	
Smith	Burke	
Smith	E.S.	-1943-
Smith	V.L.	
Smyth	Piazza	-1856-
Somerville	Mrs. Mary	1789-1872
Sommerfeld		
Sosigenes		50 B.C.
Spits	A.N.	
Spitzer	Lyman	
Spencer	L.J.	
Spoerer	F.W.G.	1822-1895
Stearns	C.E.	
Steavenson	W.H.	-1933-
Stebbins	Joel	1878-
Steinheil & Argelander		
Sterns	T.E.	
Stetson	H.T.	
Stevens	A.W.	
Stewart	J.Q. Russell Dugan	
Stewart		
Stewart	R. Meldrum	1878-1954
Stilwell	W.E.	
St. John	C.E.	1857-
Stokley		-1936-
Stone	O.	
Stone	E.J.	-1869-
Stoney	Johnstone	-1867-
Storey		
Stormer	C.	
Stracke		
Strand	K.A.	
Stratton		-1925-
Stromberg	G.	
Stromgren		1863-
Stroobant	P.	-1887-
Strong	John	-1832-
Stumpe	O.	
Strutt		
Struve	F.G.W.	1793-1864
Struve	Otto	
Struve	Herm	1854-
Struve	G.	
Struve	Ludwig	
Struve	Otto	1897-

NAME	INITIALS	LIFE-SPAN
Stuker		
Suess		
Sullivan		
Sumner	T.H. Capt.	1810-1870
Sundman		
Swift	J.	
Swift	L.	-1895-
Swings	P.	
Swope	Miss H.H.	
Taber	L.P.	
Tacchini	P.	-1883-
Talcott	Capt. Fox	-1826- & -1845-
Tancock		-1919-
Tannery		-1893-
Tebbutt		
Tempel	E.W.	-1878-
Terby	M.	
Thackeray		-1878-
Thales		B.C. 640-546
Thollon		
Thomas	A.	
Thompson	C.G.	
Thomsen	J.L.	
Thomsen		-1860-
Thraen		
Tietzen		-1893-
Tilley	Mrs.	
Timocharis		
Tisserand	F.F.	-1893-
Titius	J.D.	-1796
Todd	David P.	-1907-
Todd	T.P.	
Tolman		1934-
Tombaugh	C.W.	
Tornaghi		1874-
Tremblot		
Trouvelot		
Trowbridge		1887-
Trumpler	R.J.	1883
Tucker	R.H.	
Tuominan	J.	
Turner		
Turner	H.H.	-1912-
Tuttle	C.W.	1829-1881
Tuttle	H.P.	
Twining	A.C.	-1833-
Unsold		
Upton	W.	
Urry	W.D.	

NAMES	INITIALS	LIFE-SPAN
Valle	Senor	-1889-
Van Biesbroeck	G.	
Van de Kamp	P.	
Van den Bos	W.H.	
Van Ertborn		-1876-
Van Gent	H.	
Van Maanen	A.	1884-
Van Rhyn	P.J.	1891-
Van Tulder		
Vassenius		
Very	F.W.	1852-
Vicaire		-1872-
Violle	M.J.	
Vince	C.	1750-1821
Vogel	W.H.	-1879-
Vogel	H.C.	1842-1907
Von der Phalen		
Von Konkoly		-1883-
Von Gothard		-1883-
Von Kluber		
Von Haerdtl		-1886-
Von Lindemann		1779-1854
Von Littrow		1781-1840
Von Niessl		
Von Richenback		
Von Walterhausen	W.S.	
Von Zach	F.X.	1754-1832
Voute	J.	
Vyssotsky	A.N.	
Vyssotsky	Mrs.	
Wagman	N.E.	
Wallace		
Walterhausen	see Von W.	
Ward	I.W.	-1885-
Wargentin	P.W.	1717-1783
Wartmann		-1828-
Waterfield	P.L.	
Watson	F.G.	
Watson	J.C.	1838-1888
Watson	P.F.	
Watts	C.B.	
Webb	T.W. Rev.	-1917-
Webb		
Weinck	H.	
Weiss	J.	-1866-
Wells	C.S.	-1882-
Wells	Miss L.D.	
West	Benj.	
Whewell		
Whipple	Fred	
Whitford	A.E.	
Whiting	Sarah F.	

NAMES	INITIALS	LIFE-SPAN
Whyte		-1928-
Wilczynski		
Wildt	R.	
Willard		-1870-
Williams	A.S.	-1890-
Williams	Mattieu	
Williamson	R.E	
Willis	H.C.	
Wilsing	J.	-1886
Wilson	Alex.	1714-1786
Wilson	H.C.	
Wilson	R.E.	
Wilson	R.H.	
Winnecke		-1904-
Witt	G.	
Wolf	C.	-1902-
Wolf	Max	1863-
Wolf	M.R.	-1859-
Wolfer		-1925-
Wollaston	W.H.	1766-1828
Woodward	Miss E.J.	
Wooley		
Wren		-1885-
Wright	F.E.	-1935-
Wright	K.O.	
Wright	Thos.	1711-1786
Wright	W.H.	
Wrottesley	J.D.	1798-1867
Wurm	K.	
Wurzelbauer		-1697-
Wylie	C.C.	
Wyse	A.B.	1909-1942
Young	C.A.	1908-1934
Young	R.K.	
Young	Thos.	-1803-
Yowell	E.I.	
Yowell	E.C.	-1943-
Zach	see Von Z.	
Zanstra		
Zantedeschi		-1850-
Zeeman	P.	1865-1943
Zenger	C.V.	-1883-
Zenker		
Zessewitsch	V.	
Zezioli		
Zinner	Ernst	-1931-
Zollner	J.C.	1834-1882
Zucchi		
Zverve	M.	
Zwicky	F.	

ASTRONOMY

II

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HE THIRD ANNUAL AWARD OF THE CHANT MEDAL

47

By H. R. Kingston
Chairman of the Committee

(With Plate III)

THE third annual award of the Chant Medal by the Royal Astronomical Society of Canada has been made to Rev. W. G. Colgrove, M.A., B.D., of London, Ontario. He was nominated for this honour by Dr. G. R. Magee for very substantial services rendered in the field of the popularizing and teaching of astronomy.

During the past ten years, Mr. Colgrove has designed and constructed a series of excellent instruments for demonstrating clearly and effectively many astronomical phenomena. The series includes several planetaria; a sotellunium for demonstrating, as the name implies, relationships and relative motions in the sun-earth-moon system; an instrument demonstrating the rotation of Mars and the revolution of his moons; a set of models of the planets all on one scale (8000 miles to the inch) that may be taken outside and mounted on pillars set at proper relative positions to represent the solar system on a single scale of distances (1 million miles to the foot); stellar radiant showing the one hundred brightest stars in their proper directions and relative distances; star maps; model of our galaxy; demonstration refracting telescope with accessories, demonstrating reflecting telescope, etc. These instruments have been of inestimable value in the teaching of astronomy to students at the University of Western Ontario and especially to the large groups of public school teachers who take the astronomy course in the Summer School of the University and carry the work directly back to their schools throughout the Province and even beyond its borders. Several school boards have been supplied with duplicates of some of these instruments, which are being used also at the Royal Air Force Training School at Goderich.

Mr. Colgrove has contributed to the Journal of the Royal Astronomical Society of Canada a series of articles on the planets and has mpiled a book of facts regarding the solar system. For several ears he has given popular lectures on astronomy and has held obser-

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CHAPTER I.

THE ORIGIN AND FUTURE OF THE SOLAR SYSTEM.

Many attempts have been made to solve this age-old problem of origin. Philosophers have offered their able assistance but it remained for the great LaPlace, in 1796, to formulate the Nebular Hypothesis according to which the sun originated in an enormous concentration of nebulous matter whose rapid rotation caused the separation of irregular portions which, like the central sun, gradually became spherical and formed the planets. In recent years, however, this theory has been found mathematically inadequate.

Another suggested solution called the Planetesimal Hypothesis was worked out in 1900 by Chamberlin and Moulton, of Chicago, according to which the development of the Solar System began in a nebulous condition with a central rotating star round which great clouds of gas and myriads of planetesimals revolved. While in this attenuated condition the larger planetesimals in their revolution swept up vast quantities of the nebulous matter and became the planets. The satellites were formed in a similar manner.

A third solution is the Tidal Theory proposed by Sir James Jeans in 1916, in which a more massive passing star is supposed to have caused enormous tides on the sun which gradually broke away and became the planets. In this early stage some of the planets had very eccentric orbits and thus during perihelion passage came quite close to the sun which, like the passing star mentioned above, caused tides on the planets which also broke away and became the satellites.

The future of the Solar System and of the universe is also a matter of much conjecture. On the one hand, some physicists think of it as a mechanism running down or wearing out by the gradual conversion of matter into radiation and that it is only a question of time when the sun will be unable to supply sufficient radiant energy to maintain the normal temperature of the earth, so that it along with the other planets will gradually become

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THE VALUE OF ASTRONOMY

and the reliability of its findings
in the following fields.

ARCHAEOLOGY-	The study and identification of ancient objects such as the Pyramids, Stone-Henge,several Temples and Observatories, Meteoric craters.
ARCHITECTURE	The study of building according to the compass, setting of levels, and the careful orientation of buildings,machines and instruments.
CHEMISTRY---	The identification of elements and substances found on the Sun before they were discovered on the Earth, Example the gas Helium.
CHRONOLOGY--	The measurement of time by the rotation and the revolution of the Earth,and by chronometers and other time pieces set by the stars.
COSMOLOGY---	The age-long study of astronomy toward a better understanding of the cause,nature and future of the universe including this planet.
DYNAMICS----	The science of energy ,its sources,uses and laws in their fields of operation as demonstrated on this and other planets and the universe.
ENGINEERING-	The use of the telescope,in the form of a theodolite,together with astronomical data to prepare the way for building construction.
EXPLORATION-	The use of astronomical data in the effort to discover those parts of our world still undiscovered,by means of navigation over land or w.
FLIGHT------	The development of air travel by means of a slightly different kind of navigation in a very different kind of ship.
GEOGRAPHY---	The division of land and water areas according to geometrical methods, international standards and geophysics based on astronomical data.
GEOLOGY-----	The study of the rock-structure of the Earth including its waters toward an adequate understanding of its resources and development.
MATHEMATICS-	In astronomy,this most ancient science,the study of mathematics had its birth and still lives and leads in nearly every avenue of life.
METEOROLOGY-	A scientific knowledge of the atmosphere and a natural ability to interpret it according to astronomical data is always necessary.
NAVIGATION--	The commerce,travel and trade of this world are built on an expert knowledge and a ready use of astronomical data.
PHYSICS-----	The field of physics is so vast that astronomy is the fundamental and ancient basis of this closely related science.
RELIGION----	The whole science of religion ~~in~~ is grounded deep in the earliest astronomy known to man,that is,in the Hebrew Bible.

SOME OUTSTANDING DEMONSTRATIONS

Adams and Leverrier,by calculation,discovered the planet Neptune in 1846.
Bessel and Clark,by observation,settled the problem of Sirius'companion.in 1862.
Einstein and Planck,by calculation,developed the Unified Field and the Quantum.
Herschel and Lexell,by observation,discovered the planet Uranus in 1781.
Halley and others,by calculation,determined the path and the period of his comet.
Kepler and Newton,by calculation,worked out the laws of planetary motion in 1600.
Oppolzer and his assistants,by calculation,planned the orbits of comets-to 2162,A.D.
Roemer and Michelson,by observation and models determined the speed of light.

W.G.C.

EDUCATIONIST ATTACKS MANY ERRORS PREVALENT IN TEACHING METHODS

Rev. W. G. Colgrove, M.A., Exposes Fallacies in Popular Conceptions in Many Phases of Instruction; Address Delivered Before School Trustees and Ratepayers

At the recent convention of school trustees and ratepayers held here, Rev. W. G. Colgrove, M.A., B.D., of this city, in his address, charged that there are still many errors being ignored or taught which ought to be challenged, explained and eliminated by teachers. His question was, "Why continue to ignore or to teach exploded ideas?"

By way of example, the speaker cited some 40 items in 10 important fields of modern instruction and research and stated them in brief, thought - provoking phrases. In each case he first exposed the error and then suggested its remedy.

Mr. Colgrove's address follows:

PSYCHOLOGY

It has been said that a fixed curriculum is more important to a growing child, regardless of his unique capacities, when we know that the reverse is true and that properly organized trade and special schools would better suit the majority.

That persuasion is better than coercion, when we are fully aware of the natural lack of zest for inactive study, and of the need of something more radical than words.

That the Bogey-man is a real menace, when we know that such unwarranted misrepresentation belongs to the dark ages.

That our time-honored Santa Claus is a really benevolent person, when we should know that most of our children are accepting our gifts with snickers up their sleeves.

That periodic examinations of the kind usually set are the only proper method of advancing pupils, when we know that many children are too nervous at such times to do their best.

That the mind is only a train of thoughts, feelings and volitions, when we know that the mind is not a void, but an active centre of reference even when we are asleep.

SOCIETY

We have heard it said that peace is a mirage or a will o' the wisp when we all know that the appeal to war is the most suicidal step a nation can take, even though it succeeds.

That the "400" so-called elite are superior souls, when we have to admit that the most revolting immorality has been practised among them.

That the redcoat is above the black or the black above the brown when the Golden Rule would easily change the situation.

That some kings that keep great stables of racehorses may be, and almost must be, extolled as great Christians; and that some queens that are addicts to the tobacco habit are worthy of imitation when we should rather inculcate a careful appraisal of even royal example.

ETHICS

It is often held:

That the best basis for success in commerce and industry is the age-old practice of competition to the limit of mutual destruction if necessary when all right-thinking people know that co-operation is the only legitimate way.

That an individual's conduct is entirely a matter of his own judgment, in spite of the fact that no man liveth to himself.

That each person has a right to decide whether a certain problem is or is not a moral issue, even to the point of ignoring what we call the consensus of unbiased opinion, and this in regard to such matters as political privilege, special discounts, gambling practices, alcoholic beverages, narcotics, including tobacco and even the foul social vices.

That labor unions are the only way of combating the selfish oppression of capitalism, when all men know that friendly, honest co-operation is the magic key to mutual prosperity.

BIOLOGY

There are those who say:

That chemists are on the verge of producing life, when all thoughtful students know that they are only learning to so relate molecules that the hidden principle we call life can show itself.

That the theory of evolution is the final answer to man's fretful search for origins, when evolution is but a process and has nothing to do with primal origins at all, and the monkey myth is a false interpretation of it.

That the sciences have bowed God out of the universe, when all careful readers know that science today accords the Supreme Intelligence a universal presence and activity.

LANGUAGE

We have been told that th grammatical construction of dea languages is necessary to re culture, when we know that on a few ever need more than a work ing knowledge of modern wor formation according to prop etymological principles. A wor ing knowledge of Greek and Lat roots would suffice.

That it is necessary to study grammatical detail a number moderns, when we know that simple international langua could be made to satisfy the nee and save long periods of almo wasted time.

That all scientific nomenclatu must appear in dead Latin, whe an easy, less cumbersome mo ern medium could be devised connection with the univers language. English seems to rapidly growing in favor.

That careless use of Engli doesn't matter, when those wh recognize the errors of speech wo der why the teachers, as well the students, do not make a bett job of their instruction.

That it is immaterial what di tionary is used in our schoo when we know that different pu lishers employ different metho of orthoepy and thereby multip the errors of pronunciation.

POETRY

We have heard that even Vi torian poetry is behind the tim and should be shelved, when tho who really know are fully awa that much of the modern type wholly worthless and cannot liv

That true poetry is not a fr artistic outflow of thought su charged by the imagination, but stilted, exotic verbal mechanis when true critics simply smile such naive, half-baked, egotistic foolishness.

That we should ignore the pe fected rules and methods of t past and study to contort our co struction that we may produce i volved, and often meaningle jumbles of words, when we a aware that in many cases su methods give free rein to licen and utter mediocrity.

If these self-styled modern poe were not really in earnest in th effort, we should feel sure that th were nothing but poor actors tr ing to produce exalted tragedy ludicrous comedy. Think of sor of the stuff that issues from th machines, stuff that has no beau shows no mastery of cultural e ments and but little reading bac ground, stuff that is too heavy rise because of no imaginatio and too light to come to ear because it has no special appe Stuff that fails to please or teach or to inspire.

RTISTRY

As in poetry so in the pigment ıd the plastic arts some would ıve us either ignore or revolt ainst the rules and methods of assic expression to produce the or, drunken rubbish of today. all we who have been nurtured the thrilling achievements of iidias and Scopas and Praxitiles, who have studied the genius of ıgelo and Raphael and Titian, who have felt both the perfect spiration and the poignant spair of really great art, sur nder to this iconoclastic aspiran the throne of Apollo? Surel e devotees of such buffoonery ar ther too lazy to learn or wholl able to draw the magic lines o terpret the inherent beauty o ature. Many examples of so lled modern sculpture are unfi r gorgons or gargoyles, and some chitectural efforts are travestes of art.

ISTORY

Many seem to ~~that~~ think that the past ossesses no records of sufficient alue and elasticity to guide us our present difficulties, when all ue students of history know that ll time is a closely integrated hole and that, therefore, the resent and the future are to be terpreted and understood in ieir proper relation.

That we should not meddle with xisting forms of government, as ıough human intelligence is atic and the changes in history ıeaningless. Sequence and relaon must be understood.

That a government has a right authorize certain persons to onvert foodstuffs into destructive rugs which destroy men and vomen that revenues may inrease, when, at the same time, the ame power authorizes textbooks gainst it.

HYSICS

Some continue to teach:

That colors have objective realy, when it is clearly known toay that all the colors we see are roduced within our own minds nd that photography has proved

That the so-called ether is an ıaginary something altogether yond discovery and definition. hen we now know that space is e vast reservoir of reflected, deected and commingled radiant d gravitational energy which ay be the real medium of wave otion.

That the sun, moon and stars se and set each day, when the nnual revolution and the diurnal tation of the earth should be uch more definitely and clearly ıown as the explanation

That the sun stands still and the lanets revolve round it in closed lliptical plane orbits, when their anslation through space with the un causes them to describe vast pen helical paths in which they ctually travel much farther and aster than we have been told.

That the moon by its positions and phases largely controls the weather, the germination of crops, the success of broods and many other things, when science cannot discover the slightest satisfactory evidence of such connection.

That the ecliptic wobbles up and down with the seasons, when our students should be shown by the use of a model that this is only apparent and that it is due to the movement of the earth as it carries the equator with it.

RELIGION

One often hears: That religion is at war with science, when if rightly understood science has become the most effective servant of Christianity and the most relentless foe of all false religious fads.

That the Bible is merely a tenaceous Jewish tradition unsuited for our times, when it is well known that if given a chance to rule one's life it adds a surpassing beauty and a supernal glory to it. Teachers should be able to explain it without denominational bias.

That one religion is as good as another, when anyone who has studied the religions of the world knows that Christianity is the only adequate religious system which satisfies the exalted aspirations of the human heart.

That ethical culture, or theosophy or spiritualism or so-called Christian Science has a standing equivalent to or better than Christianity, when those who understand are fully aware that Christianity demands not only the acknowledgment of deity and unselfish service but also an individual, unconditional surrender of every area of life and heart to Jesus Christ as deity, together with a living loyalty and a deathless devotion to His principles and His cause.

That Christianity is only one more stage in the development of religious expression, some day to be superseded by something better, when all who are aware of its true genius know that this culture of the spirit elicits and requires the highest human psychic element, love, which is also the highest known element in the nature of deity, and gives to the Gospel its claim to finality.

AN INVENTOR TOO

LONDON, Ont., May 11.—Whether you want to bomb Berlin or measure the shadow on the earth when the sun is slipping its light over the North Pole, W. G. Colgrove, M.A., B.D., is the man for you. He has invented the means of doing both and several dozen other things besides.

ONCE A CLERIC

BY profession, Mr. Colgrove, is a theologian and until two years ago was a member of the United Church ministry. But ever since he was a young man going to McGill University "wheels" have been in his head and now he spends his mornings at the University of Western Ontario arranging a collection of botanical specimens and his afternoons and evenings inventing means of seeing the skies and telling about them for the expert astronomer and the novice.

Last fall the W. G. C. sotellunium came into being and was demonstrated at the Western Fair. By it a man can understand why midday at the Pole is dark and midnight is light; he can see the four seasons before his eyes and the phases of the moon, and he can see those strange things, sunspots, which are the cause of rains, good crops, bird migrations and happy dispositions.

Just completed and now ready for demonstration is a smaller model of this sotellunium suitable for use in high schools where astronomy is now on the course of study. "Twenty dollars will buy one," Mr. Colgrove told The Star, "and it does what no other instrument at the present time can do."

BULB IS THE SUN

This sotellunium stood on the dining-room table in the inventor's home. A metal post at one end is the largest part of the instrument and holds it upright. On the top part of the post is a lamp representing the sun.

A high-powered bulb is the sun and over it rests a shade. "That looks like a honey pail," ventured the reporter.

"That is exactly what it is," answered the inventor, "I had a special shade made for it, but it didn't work. The honey pail is perfect!"

And turning the shaft of the whole sotellunium is that reason for smooth custards and melting souffles, the Dover egg-beater. "There is nothing like it for a gear!" announced Mr. Colgrove, "It works like a charm."

The large wheel on the egg-beater is used in duplicate, one for the main shaft to turn the whole instrument and the other for turning the earth and moon together. The small wheels on the beater come into their own also for reverse motions.

And that hardwood knob which keeps feminine fingers from burning does its turn as revolving wheel for the earth. The hardwood knob is placed at the one end of the earth, resting on a metal plate. As the earth revolves around the sun the knob moves on the metal plate and turns the earth in rotation.

NO SCRAPING

"Metal knob would slip," Mr. Colgrove explained, "or scrape." It would not do the trick. But the hardwood knob moves without scraping and without wearing out!"

The collegiate sotellunium is part of Mr. Colgrove's attempt to put the heavens in their proper position for the ordinary student. "For instance," he explained, "the rising of the sun, its midday glare and its setting have always been taught so that the student would have to think of the rising sun being somewhere at his back, so that he had to stretch his neck back into an unnatural position to visualize it. Now I have changed the teaching so that the rising is shown at the left, the midday in the centre and the setting at the right."

It is all in the way you wish to turn your head. Mr. Colgrove likes to keep his head looking straight ahead and thinks other students of astronomy do also.

Some 20 instruments are now numbered among the former minister's collection and are all at the university. But still at home for the family's enjoyment is the game, Bombing Berlin. It looks like a banjo, handle and base, but instead of strings or wires, it has wooden pegs which represent the outskirts of Berlin. In the centre is a larger peg, the very heart of the city. From the end of the handle the player flips a wooden ring to try and bombard Berlin.

Bombing Berlin is the last in a series of games invented by Mr. Colgrove, however. 'Way back when the Germans were bombing near Paris, he made the Funny Face Family, which was owned by thousands of boys and girls in the United States, where Mr. Colgrove was living at the time. The family included Reddy, Whitey and Bluey, standing for Red, White and Blue. Reddy, or daddy, was soldier; Whitey was mamma, and Bluey was a Boy Scout. Of wooden blocks, they could be made into other people at the touch of the child's hand.

ROCKING DOLL BUGGY

A few years later Mr. Colgrove, then living in Buffalo, had the idea any little girl would like to rock her doll to sleep while she wheeled it down the street in its buggy, and so he invented a doll buggy which would rock as it rode. "I sold the idea," Mr. Colgrove said, "but it never got to Canada."

And for the mother of the little girl Mr. Colgrove invented a baby carriage which would go up and down hills on the power from a battery instead of from the energy of the person pushing it.

But the company went into receivers' hands and so the buggy is still just another invention.

"My most famous invention," recounted Mr. Colgrove, "was not an invention at all! I was in Buffalo at the time of the presidential fight between McKinley and William Jennings Bryan. Then all organizations used to hold demonstrations at which they wore false faces and paraded down the streets. I had the idea of making the faces of the two candidates and sold it to the only large firm in the States making false faces."

"In a few days thousands were sold. I'd have cleared two or three million dollars. But the company could not turn them out fast enough!"

In every inventor's life, Mr. Colgrove reminded The Star, there is one invention which someone else capitalizes on. His was one of the most important inventions of modern times, the mitre-joined railroad rail. "Rails used to be square-joined," he explained, "and that is what caused that awful clackety-clack. I discovered that if the rails were tapered they would not cause that sound.

INTEREST WANES

Four years after my invention I was riding from Boston to Buffalo. I noticed there was none of that clackety-clack and inquired what it was. I found out the train was running on mitre-joined rails."

But unlike most inventors, Mr. Colgrove chose to preach instead of make money. "As soon as the invention is completed to my satisfaction, I lose interest," he declared. "I thought I was intended to be a minister and that is what I determined to be."

But for the past two years he has been retired from the ministry and all his time now goes to inventions. It may be an astronomical device or it may be a wall baseball game which groups in London churches are using for fun. Whatever it is, for Mr. Colgrove its invention is a hobby. This man who was born in London and has lived here for the past 17 years still considers making things just an avocation. His vocation now is arranging the botanical displays at the university.

~~MODELS~~ THE UNIVERSE and ITS STARS ~~CHARTS~~

dealing with a very large subject like this, one cannot attempt more than a broad atment with a few outstanding examples.

We are all aware that unaided eye observations are entirely inadequate in repenting to the mind a three-dimensional space, and even when its power is increased means of a telescope it is not much better. But with the use of a variety of essory instruments and the development of mathematical calculations it is possible pproximate the actual shape of things.

The questions that we must try and answer tonight are:-
hat is the probable extent of the Universe? 2. What are its constituents?
hat is known about our own Galaxy? 4. How is this information obtained? and
hat is the nature of the stars?

1. The first question is the most difficult because we are not able to visualize true form or dimensions of the Universe. There is no philosophy, no physics, no trumental equipment and no mathematics quite equal to such an enormous and baffling k. But man will not be satisfied with a negative reply so long as there is a ray light to guide his untiring search. Prof. Einstein has attempted an answer to the ect that space is a warped or bent continuum which curves back upon itself, in one se, like a sphere whose surface is finite but unbounded. But we are not satisfied.

2. The second question asks about the constituents of the Universe and we are py to say this is not so difficult, although we are by no means sure that we know ry possible one. For far beyond our present reach which is about 500 million light rs or some 3 sextillion miles there are, possibly, great numbers of objects whose ure and appearance we cannot even guess. Nevertheless we can tell a good deal about ones we know.

Perhaps the largest constituent is gas, or gases of various kinds, in the midst which we find numberless gaseous condensations which seem to be the probable birth ces of stars. Mingled with this gas constituent there are vast accumulations of mic dust and dark material which eclipse millions of stars and affect the color of tant objects so that their sizes and motions are difficult or impossible to determine.

The various kinds of stars and their interesting combinations are perhaps the t important consituents and may be listed as follows:-

Evolving stars - those that present aspects which belong to initial stages of developt.

Single stars - most of the stars have no friends, at least none close enough to dance th.

Multiple stars - most of which are called doubles, some in the line of sight, others the form of physical binary systems. It is said that probably one fifth of all the ars have companions.

Variable stars - with short and long periods, some eclipsing, others in mutual relution but not in our plane. Others again are single pulsating stars like the pheids, while still others are exploding stars like the Novae.

Moving stars - which travel together like the Pleiades or Hyades and are gradually tering the apparent shape and content of the constellations.

Streaming stars - composed of great groups from various constellations that partake the rotation of the Galaxy.

Dwarf stars - including white dwarfs like the companion of Sirius.

Main sequence stars - including all medium stars like the Sun and Capella.

Giant stars - including supergiants like Antares.

Shell-forming stars - including the Novae and supernovae.

Planetary Nebulae and their central stars.

Irregular stellar clusters like the two Magellanic Clouds.

Globular star clusters like that beyond Hercules.

Spiral star systems like that beyond Andromeda. accd. to Einstein 11 billion of them.

Besides these or rather included among the spiral systems is our own Galaxy bounded that vast circle, the periphery of the Milky Way. Just outside this there are the obular clusters and within it there are stars, planets, satellites, planetoides, comets d meteors.

3. The third question regarding our knowledge of the Galaxy may be answered quite ısily because of the persistent and painstaking work of many astronomers. The latest ıd best information has been supplied by our own Canadian astrophysicists at Victoria .C. and states that its general shape and motion are in all probability similar to ıose spirals we see far out in space. Its orientation, appearance, dimensions, mass ıd rotation as well as the approximate number of stars, star groups, clusters and ebulous bodies within our reach are known. Its orientation is determined by its reation to the celestial equator and its great central line cuts the equator at right scension 18h.42m. and 6h.42m. at an angle of about 62 degrees. Its north pole is eyond Coma Berenices and its south pole beyond Cetus. Its diameter is about 100,000 ight years or 600 quadrillion miles and its thickness about 10,000 light years or 60 ıadrillion miles. Its mass is said to be of the order of 200 billion suns which when ıltiplied by the mass of the sun, which is 2 octillion tons, makes its weight amount the staggering number 4 with 38 ciphers tons. Its rotation at our position, 32,000 ıght years from the centre, is about 165 miles per second and yet it takes 220 million ears to make one rotation. The number of stars has been greatly increased by recent ıotographic results and now instead of 30 billion, it has reached the 100 billion ırk which includes 300 open clusters, nearly 100 globular clusters and many moving roups as well as much gas and dark material.

4. The fourth question asks, what are the methods used in obtaining this informaıon? and while I think the answer should hardly be part of this discussion I will ive a few suggestions. The methods may be said to be largely covered by observation, easurement, calculation and deduction each assisted by a variety of accessory intruments such as the camera, the spectroscope and spectrograph, the interferometer, ıe thermocouple, the blink microscope and various star catalogues. The distances re found in several ways such as by the solution of triangles obtained by the ordinary ırveyer's method; the solution of very small angles obtained by parallax determination; ıe comparison of spectroscopic absolute magnitudes, and the tedious examination of ıe variations of the light of Cepheid variable stars by means of the microscope on ıotographic plates. Star diameters are found with the interferometer attached to the 00 inch reflector at Mt. Wilson. Star temperatures are obtained by the bolometer and ıe thermocouple and the light intensity by the photometer and the radiometer. The ost useful instrument of all is the spectroscope with its prisms which form the eautiful and revealing spectral bands and lines of individual stars. Often a large rism is attached in front of the objective of a telescope so that whole fields of tar spectra are produced on a single plate for easy examination and comparison. Thus heir positions, magnitudes, motions and colors can be judged and many interesting deuctions made. To expedite this tedious work the stars have been carefully arranged ccording to their spectra in several classes as follows:-

B A F G K M R N S O be a fine girl, kiss me right now sweetheart.

5. The fifth question regarding the nature of the stars may now be answered by tating that all known stars are gaseous throughout but denser and hotter toward the entre and by giving a brief description of some outstanding examples of various kinds. ut first may we express some thoughts about their evolution which, of course, is a ifferent process from biological evolution. Perhaps the foremost expert in this ield today is Professor Bethe of Cornell University whose theory is expressed in what s called the Carbon cycle which has attracted much attention. He says that in the ingled gas and dust of space a variety of motions are very gradually set up by light ressure and gravitation working in opposition. That, as time goes on, certain hydogen protons penetrate atoms of carbon, oxygen and nitrogen to produce light rays and t the same time leave the carbon atom intact to be used indefinitely. The cycle egins when the central temperature of a star has reached about 15,000,000 degrees and s completed in about 50 million years only to be repeated until all the star's hydrogen s converted by this carbon catylist into helium. The question arises, when this has een done what will the star do, just suffer eternal refrigeration? Drs. Lyttleton nd Hoyle of Cambridge University research foundation say NO! there is plenty of hydogen in space for the stars to use and who knows but that more is in the making.

hey say the sun itself sweeps up some 110,000 tons of it each second. Others, however, oint out that this is not enough, for the sun, at present, is radiating 4,200,000 tons f light each second and to keep that up must transform 564 million tons of hydrogen nto 560 million tons of helium each second of time. Evidently we shall have to ait for further study and calculation.

Let us now describe some characteristics of a few of the more important stars. e shall begin with the nearest and stay within a sphere of space of little more than 00 lys. radius. With present equipment we can study stars out to the 21 magnitude, r beyond the limits of our system. It is said that it would take 100 million stars f the 21st magnitude to equal the brightness of 1 of the 1st magnitude. The apparent agnitudes are estimated on an arbitrary scale in which each is separated from the next y 2.512 times. The magnitudes increase as the brightness of a star when placed at a istance of 10 parsecs or 32.6 light years. At such a distance our sun whose magnitude s 26.5 would be only 4.73 absolute magnitude. The actual diameters of the stars ange from about one fiftieth of the sun to some 3000 times its diameter while their uminosities increase from one-thousandth of the sun to 600,000 times its brightness s in the S. Doradus twins 85,000 light years away in the Large Magellanic Cloud near he south pole of the sky.

In this same hemisphere our nearest star, a rather small one, is associated with double star known as A and B of Alpha Centauri. All three stars are about 4.3 light ears distant or 25 trillion miles. A and B revolve round each other in 80 years and, n account of the eccentricities of their orbits, the distance between them varies rom 11 to 35 astronomical units, or from 1 billion 25 million to 3 billion 200 million iles - farther than Saturn and nearly as far as Pluto from the sun. The smaller aint companion mentioned above has been found to be nearer than Alpha and is called roxima and makes the group a triple rather than a double star. Its diameter is about 200,000 miles and it revolves round the other pair in about a million years and its light is only one-fifteenthousandth of the sun.

Our mission of examination now takes us out to Sirius the great dog star, brightest in the sky except our sun. It is an A type double star only 9 light years away or about 54 trillions of miles. Its temperature is 10,700 degrees C like the sun and it shines with 39 times the sun's light. Its diameter is 1.8 times the sun or 1½ illion miles. Its mass is about 2½ times the sun and its surface gravity is 28 times that of the earth and like the sun. The companion of Sirius is a faint, small, heavy star, the first white dwarf found. Its diameter is only 30,000 miles, like the planet Uranus while its mass is almost equal to the sun and its surface gravity is 53,000 times that of the earth so that 1 pound of it would equal 10 tons here. It revolves round Sirius in about 50 years and is now apparently nearing Sirius and will be out of sight ~~during 1944~~. for some years.

From Sirius we speed across to Cygnus to examine No. 61 which is one of our nearest doubles and like Alpha Centauri has been found to be triple. Its parallax was the first to be obtained and its distance determined. It is about 10.8 light years away and the two original components revolve round each other in 720 years at a distance of 10 billion miles. Their light is only one twentieth and one fiftieth of that of our sun. But the main reason for our visit is the existence of a prodigy, unique up to date, in the form of what appears to be the first planet discovered outside the Solar family. It is a huge globe of dark material revolving round one of the pair in 5 years at a distance of 65 million miles. Its mass seems to be about 16 times as great as our planet Jupiter and so the world has been thrilled again by an unusual astronomical discovery and much time and study are being spent upon it.

Our next stop will be at Vega in Lyra. This is a single fellow too brilliant to be bothered with a companion. It is another A type star of high temperature some 27 light years away and very steady in his habits - such folks, you know, do not get much publicity, so let us just take a passing glance at his two faithful attendants, the famous double suns and then go on our way.

From Vega we fly to Arcturus another single star of K type and therefore cooler. Its distance is 33 light years or 198 trillion miles and its diameter is about 22 times the sun or 25 million miles. It gives about 100 times as much light as the sun

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although its temperature is only 4230 degrees C.

Next we shall call on Capella, the Kid star, of G type like the sun but double, with a temperature like the sun. It is 42 light years away or 252 trillion miles and has a diameter of 13,800,000 miles or 16 times the thickness of the sun. It gives about 150 times the sun's light. Its little companion revolves round it in 104 days at a distance of 50 million miles but it is unimportant.

Now let us go over to Castor a double A type star. This, of course, is one of the twins in Gemini which appears single to the unaided eye but when resolved in the telescope becomes an excellent double revolving round each other in 340 years at a distance of 7 billion 440 million miles from each other. But spectroscopic studies have shown that each one is a binary system, the fainter pair revolve in a period of 3 days and the brighter pair in a period of 9 days. Besides these pairs there has been found a very faint star revolving round the brighter pair and now it is known to be a binary also. We have, then, six stars where we see only one with the unaided eye.

We now go on to the great giant Aldebaran a fine single K type star slightly reddish in color, similar to Antares but always higher in the sky and in the Hyades group. It is a rather cool star with a temperature of only 3300 degrees F or only half as hot as the sun. Its distance is 53 light years or 318 trillion miles and its diameter 35 times the sun or some 30 million miles. It would require a battery of 91 suns to equal its light.

Our next visit will be paid to Mizar in the big dipper handle, the first combined visual and spectroscopic binary found. It is like Sirius, only it is about 9 times as far away and its companion is not an abnormal mate. Its distance is 78 light years and its diameter is 1,600,000 miles or about twice that of the sun. Its density is one third of the sun and its mass 4 times as great while it shines with 30 times the sun's light. Its little companion revolves round it in 20½ days at a distance of 22 million miles and on closer examination proves to be a binary in its own right. And it is interesting to find that Alcor, its naked-eye companion, is also a binary system. Here we have 5 stars where many of us see but one.

From Mizar we take off for the constellation Cassiopeia where Gamma is a very peculiar star. It is a true double in that the components are still connected like the bulbs of an hour glass with the great gaseous envelope wrapped round both of them. It is 93 light years away and has a diameter 8 times the sun or 6 million 900 thousand miles which, as it revolves, seems to vary from 8000 to 18000 times the sun and at the same time its temperature varies from 9000 degrees to 13000 degrees. Its mass is 12 times the sun. When they let go will there be a Solar system?

The next interesting stopping place will be the Demon Star Algol in Perseus. This is a B type eclipsing binary whose eclipses take place every 2 days 20 hrs. 49 min. Eclipsing stars appear to vary in brightness but they are not proper variable stars which are almost always single. This blinking demon is 99 light years away and its diameter is 2,700,000 miles while its density is only about ¼ of the sun. The companion's diameter is 3,200,000 miles and its density and light are equal to the sun. The distance between them is about 3 million miles and they appear to lose about four fifths of their light during the height of each eclipse. It is agreed that there are probably 2 or 3 would-be interlopers lurking around but they have not yet been observed.

We shall now make a dash over to Spica in Virgo, a magnificent blue B type binary, young and vigorous and with a temperature of 20,400 degrees. Its distance is 120 light years or 720 trillion miles while its diameter is not yet known. The masses of the components are 9.6 and 5.8 times the sun. They revolve round each other at 1.2 miles per sec. in only 4 days at a distance of 11,000,000 miles.

From Spica we rush across the pole to Cetus where we find Mira, the wonder star, an M type variable whose actions are not yet fully understood. Its distance is 250 light years or 1 quadrillion 500 trillion miles and its diameter 397 million miles. It seems to be a single pulsating star but with an irregular rhythm. Its temperature varies from 1900 degrees to 2600 degrees and its maximum brightness reaches 180 times that of the sun. The variation takes 330 days and covers over 6 magnitudes from the 2nd to the 9th. Mira is probably a proper long-period variable without a companion.

And now, as fast as light, let us turn back across the sky to the constellation orpius where the great red supergiant Antares awaits us. Here is another M type mary star at a distance of 250 light years, the same as Mira, and with a diameter ly a little less than hers, or about 330 times the sun which makes it 285,000,000 iles. To match its huge bulk we should need 36 million suns but its mass is only 30 imes that of the sun while its density is but one-one millionth of the sun. It shines ith a brilliance 1900 times the sun. Its companion is very small and little is known f its characteristics.

Once more we cross the sky to visit the mighty hunter Orion and examine two of his rilliants. The first is Alpha named Betelgeuse another M type reddish single supergiant. It appears to pulsate like Mira. Its distance is about 300 light years or 1 uadrillion 800 trillion miles and its average apparent diameter is about 400 times he sun or 345 millions of miles. Its temperature is low, only 3200 degrees but its ight is 2000 times that of the sun. While we are in this constellation let us slip ver to Rigel a brilliant single blue B type giant. Its distance is more than twice s far as we have come already or 543 light years, and its diameter about 30 million iles. Its temperature stands at about 12,300 degrees and its luminosity at about 5,000 times the sun.

From Orion we fly back again to Auriga to visit Epsilon with its enormous faint ompanion at about the same distance as Rigel, 543 light years. This companion ~~steals the show, for it~~ is a dull, vast, invisible globe whose diameter is said to be 3000 imes as great as the sun's which would make it some 2 billion 600 million miles across. ts density, however, is only one-millionth of our atmosphere and it takes 27 years to evolve round its primary. ~~This is the largest body known in the Galaxy but~~ its mass s only 30 times that of the sun. This peculiar star would fill the space between the un and Neptune. V V Cephei is another similar stellar oddity whose distance is about 500 light years. The smaller star of this pair is said to have a diameter of 19,000,000 iles and a mass of only 40 suns; ~~but its~~ and their luminosity equals 250,000 suns, and its volume s about 27 billion times the sun. its dull giant companion has a diameter of 2½ billion miles a mass 57 × ☉

We have already mentioned sufficient stars to indicate their nature but there is ne more variety called Novae which appear to expand and form enormous shells of gas far ut from the stars themselves. We shall list only a few, such as one in Perseus in 901, the one in Aquila in 1918, the one in Cygnus in 1920, the one in Hercules 1934, he one in Lacerta in 1936 and the one in Puppis in 1942.

The greatest Nova or exploding star on record was first seen in China back in 054 A.D. and it is said that its maximum brilliancy must have been 100 million times our sun. Today the Crab nebula in Taurus stands almost exactly on the same spot, as it were, and may have been formed from the expanded shells of that Nova.

And finally, where are we in this welter of stars? We are with our sun wherever it is. Let us examine our model of the Galaxy and, by noting the following instructions find our place among the stars.

Revolve the tiny earth until it arrives abreast of December 21 on the ecliptic circle, then rotate the earth until the black spot that represents the horizon plane faces the sun, then turn the whole instrument intul the earth's north pole points to Polaris and note the following:

(a) At midday on December 21, as viewed from the earth, the sun appears at the winter solstice directly south on the ecliptic which is then below the celestial equator about $23\frac{1}{2}$ degrees.

(b) At midday also the sun is between the earth and Sagittarius, while the latter is between the sun and the Galactic centre which lies some 32,000 light-years beyond.

(c) At midday too the Milky Way lies eastward about 28 degrees from the celestial pole and arches from N.N.E. to S.S.W. cutting the celestial equator at 6 hours, 42 mins and 18 hours, 42 minutes close to the solstices.

(d) At midday again the vernal equinox is eastward and the summer star Vega is almost overhead.

(e) If we rotate the earth, and imagine ourselves at the centre of the horizon spot, we shall find that at 5 hours and 21 hours on the celestial equator the Milky Way appears nearly parallel to our meridian while at 12 hours it is nearly parallel to our horizon plane.

ummary

THE UNIVERSE

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1. What is the Universe?

ot the world, not the solar system, not the Galaxy (Milky Way). t includes EVERYTHING from the atom up. We have not time to discuss ll phases but only the Astronomical and this Space-Time chart will erve to introduce our subject. The infinitesimally small and the nconceivably great. ------SPACE & TIME CHART ------

2. How did it happen ?

o body knows but many guesses have been made -
HANCE - There is chance but it could not result in intelligent mechanism.
VOLUTION - Recent physics rules out evolution in respect to origins.
REATION - The only adequate answer, requires faith. Planck's God.
OW OLD - Geology says ⊕is 2 bill.yrs.old, Astronomy says Universe s much older,perhaps 3 bill.to 10 bill. and possibly 40 bill.yrs.more
ow long - Cold(heat-death),Hot(Bible), Uranium Cascade to rad.lead. nd further transmutation of elements nova - Hydrogen to Helium and light.

------BETHE CARBON CYCLE ------

3. HOW large is it ?

Was much smaller, is getting larger, only partly known or understood. Astronomers can see 150,000,000 light years and photo 500,000,000 lys. Apparently expanding,if it continues at same rate, double in 2 bill.yrs.
How is this determined? - Newton's experiment with prism.SPECTROSCOPE.
Three kinds of spectra - Continuous - Bright line - Dark line.
The Doppler effect - A slight shift of lines to red or to violet.

------ SPECTRUM CHART ------

4. What does it contain?

We cannot name anything outside of it but we discuss Astronomical only.

1. Various gasses, electrical energy, gravitation, cosmic matter.
2. Evolving stars - atoms of gas attach to particles of cold matter.
3. Single, double and multiple stars like Algol, and Mizar and Castor.
4. Open clusters by the hundred (300)like the Plieades and Hyades.
5. Variable stars by thousands (Cepheids),Pulsaters like Mira.
6. Moving families like the Hyades, Plieades and the Big Dipper.
7. Streaming aggregations (two) moving in opposite directions.
8. Dwarf stars like the companion of Sirius - I cubic in.= 1 ton.
9. Giant stars like Antares,Betelgeuse,E Aurigae, and VV Cephei.
10. Exploding stars like the Novae and the Super novae - Crab neb.
11. Large irregular groups of stars like the Magellanic Clouds.
12. Planetary nebulae in the form of vast rings - doughnut in Lyra.
13. Globular clusters of millions of stars (93) like Hercules' sunburst.
14. Spiral galaxies like our own with billions of stars rotating -
15. Planets,satellites,planetoids,comets and meteors. 11 bill. Einstein.
16. Vast quantities of spent light of various qualities.

------ ~~CONTENT CHART~~ ------

5. How can we sense these enormous dimensions?

Yardsticks - Diam.of ⊕ ,diam.of ⊙ orbit, light year, parsec, megaparsec.
Method - Surveying, parallax, Leavitt's Period-luminosity Relation -
(If average brightness is high the period bet.successive maxima is long. To determine,get the period and its log,then find its absolute mag by $M=-0.28-1.74 \log P$. Now use $\log d=0.2(\dot{m}-M-d\dot{m})+1$ where d is dist.in parsecs and $d\dot{m}$ is the correction for gas&dust).
Break down the Sun's radiation - light 3 oct.heat 900 sex.cal.weight 2 oct tons. and energy 500 sex.h.p.
Story of a spider web. ---- METHOD CHART ----

6. Where are we in this vast concourse of stars? See bottom of preceding page.
~~Planetary paths and Rotation of the Galaxy.~~

------GALAXY CHART------

The Universe —
our place in it.

THE JUNE STARS

This is the month when the sun, on the 21st day, apparently moves into the constellation Cancer, the Crab, and the season called summer begins. It is also the time of the summer solstice when the sun is farthest above the celestial and equator (23½°) where it apparently begins to creep down the ecliptic circle to the autumnal equinox. Since, during this month, the earth's axis, on account of its inclination, will lean more and more toward the sun, the summer months will grow steadily warmer because the earth will be receiving the sun's rays from almost overhead as is shown by our shortened shadows. Much of this radiation will be absorbed by the earth to build up its heat reserves which remain well into the fall of the year.

We must now consult our map and, beginning at the top, the first constellation is URSA MINOR (short u and a, long i short o) falsely called the Lesser Bear or the Little Dipper. It has nothing to do with either but, according to the ancient Arabs, it was known as the Lesser Flock which is in harmony with the pastoral picture which they saw in the sky. The early Danes called it the Chariot of Thor but that shows that, like the Greeks, they did not understand the Arabic language. This little constellation has three important stars: No.1. is Polaris (short o long a short i) the Pole Star which is situated only about one degree from the spot which is the pole of the sky. Its position is easily found by drawing a line through the two first stars of the Big Dipper bowl and extending it in a northerly direction. Polaris is a fine visual double star, the companion being a faint light blue color and of ninth magnitude while the brighter one is of second magnitude and 407 light years away. It is approaching us at about 11 miles per second. Not long ago it was found to be a trinary system of stars. The two bright stars in the bowl are No.2. Kochab (long o, ch like k, short a) and No.3. Pherkad (short vowels) which are called The Guardians of the Pole. The former is 109 light years distant, is of second magnitude and is retreating at about 10 miles per second while the latter is 148 light years away, is of third magnitude and is approaching us at about 2½ miles per second.

The second group is part of the long sinuous constellation DRACO (long vowels) the Dragon which means the one trodden on and stretches across two more maps until its head lies beneath the powerful heel of Hercules. In our present sketch Draco is represented by only two bright stars: No.1. is Thuban (long u short a) which means the subtle spirit. Stories about a great dragon are to be found in all ancient records of religion including the Bible and refer to an evil spirit which tempts men. Thuban was the pole star some 4000 years ago. No.2. is Iota 109 light years away, is of third magnitude and is approaching at about 7 miles per second. We shall follow this strange creature next month.

The third group is the fine constellation BOOTES (all vowels long) which means Herdsman or Shepherd not a plowman and by no means a driver of bears as some continue to teach. A shepherd is just the one to be in charge of a sheepfold. This figure is facing us and holds a rod in his right hand to protect the sheep. The chief star No.1. is Arcturus, the brightest one in the northern hemisphere which in arabic means the guardian of a sheepfold not a group of bears. The word comes from the root arx which means a strong enclosure and has no connection with the Greek arktos which means bear. Why did those Greeks blunder so? Arcturus is a first magnitude star, is 32 light years away and is coming at about 3 miles per second. It is similar to our sun in chemical constitution but is 100 times as bright and 30 times its diameter or about 25 million miles. It was the star by whose light the Century of Progress Fair wes opened in Chicago. No.2. is Mufrid which is of third magnitude and 33 light years away. No.3. is Mirac or Izar 172 light years distant, of third magnitude and approaching at about 10 miles per second. No.4. is Alkatrops which means a rod, is of three and a half magnitude and is a fine double star. No.5. is Seginus which is of third magnitude, is 52 light years distant and coming at about 21 miles per second.

The June Stars 2

The fourth group is CORONA BOREALIS (short o,long o,short a;long o,e,a,short i) e Northern Crown. This is a small constellation with but one bright star Gemma which of second magnitude and 60 light years away. There are several doubles here and me strange variables especially one called the Blaze Star which flared up seven mag- tudes and then sank out of sight.

The fifth group is part of the shoe-string constellation SERPENS which has no ight stars but boasts of several fine doubles and a great globular cluster two- irds of the way from its chief star Unuk southwestward toward the intersection of e equator and the 15th.hour circle.

The sixth group is part of VIRGO where we see only her feet with no important ars except those which form her shining slippers.

The seventh group is LIBRA (long i,short a) the SCALES which lie on the ecliptic rcle and has only two bright stars. One is Kiffa South which is of third magnitude, 58 light years away and is coming at about 6 miles per second. The other is Kiffa rth which is also of third magnitude is 217 light years distant and spproaching about 22 miles per second.

W.G.COLGROVE

THE TAURUS STARS

Its Names - The Egyptians called this constellation the Coming Chieftain. The Hebrews called it the Reem, a powerful, untamable, long-horned beast. The Greeks named it Taurus because of its horns. The Romans kept the same name, while in English we call it the Great Bull.

Its Mythology - Among the Greeks this gigantic creature was supposed to represent the great god Jupiter who was said to have caught Europa and carried her away on his back to the island Crete. Both the Hyades and the Pleiades were the daughters of Atlas, the upholder of the world, and were placed in the sky because of their mutual sympathy and affection. The Hyades are often spoken of as the Wild Geese, and the Pleiades are called Doves because when Orion fought the Bull they took fright and implored Jupiter to help them. They were able to escape when he turned them into doves.

Its Astronomy - The average distance of the Hyades group is about 400 light years or 2⅛ quadrillion miles, while the Pleiades group is about 350 light years or slightly more than 2⅞ quadrillion miles away. It is engulfed within a vast body of gaseous nebulocity. Most of the stars in each group are moving together in the same general direction through space and all inside our local Galaxy.

This constellation belongs to the zodiac and used to stand in second place from the vernal equinox but, on account of the precession of the equinoxes the vernal equinox has moved into Pisces. We should therefore no longer repeat the ancient dity
" The Ram, and the Bull, and the heavenly Twins," etc. but we should learn the modern rendition suggested by one of our honored members which goes

" The fish and the Ram and the bright-eyed Bull,
The Twins and the Crab and the Lion cruel,
The Virgin, the Scales and the Scorpion,
The Archer, the Goat and the Water-man."

W.G.C.

Its Stars - The chief star in this constellation is the notable red giant Aldebaran which, in Arabic means both Leader and Follower because he leads his followers and follows the enemy. It is a first magnitude star and brightest of the constellation and is called the Bull's eye. (Puzzle, find his other eye.) It is 53 light years away and has a tiny companion which is unimportant. Its diameter is said to be 35 times that of our sun or a little over 30 million miles, but it is a K type star and therefore its temperature is only half as great. Its brightness is equal to 91 of our suns but on account of its great distance we receive from it only 1/ 25 billionth of the amount we receive from the sun. If, however, the earth were placed half way between the sun and it, Aldebaran would be 160 times as bright as the sun. Its annual proper motion is .205 seconds of arc, while in its radial velocity it is receding from us at about 34 miles per second.

β El Nath in Arabic means Butter, the one that butts. It is a clear white star of second magnitude at the tip of the northern horn and is 116 light years away or about 700 trillion miles. It is receding from us at about 5 miles per second and in its proper motion across the sky it travels .180 seconds of arc each year. Its spectral type is B which indicates a very high temperature.

ζ Zeta, at the other horn tip is also a B type star 326 light years away. It is a spectroscopic binary or physical system and its annual proper motion amounts to .028 seconds of arc. Its speed of recession is about 10 miles per second.

θ Theta, just below Aldebaran, is a fine visual double, a pair of shining wild geese of magnitudes 5 and 5½. Their annual proper motion is .105 seconds of arc. R.V.var.

λ Lambda, southwest of the Hyades, is an eclipsing double like the blinking Algol and is of third magnitude. It is a short-period variable with a mutual revolution of about 4 days and a proper motion of .015 seconds of arc. It also is a B type star of high temperature and is some 407 light years away, ~~and is leaving our vicinity at about miles per second.~~ Its speed of recession is also variable.

Stars

The Taurus 2

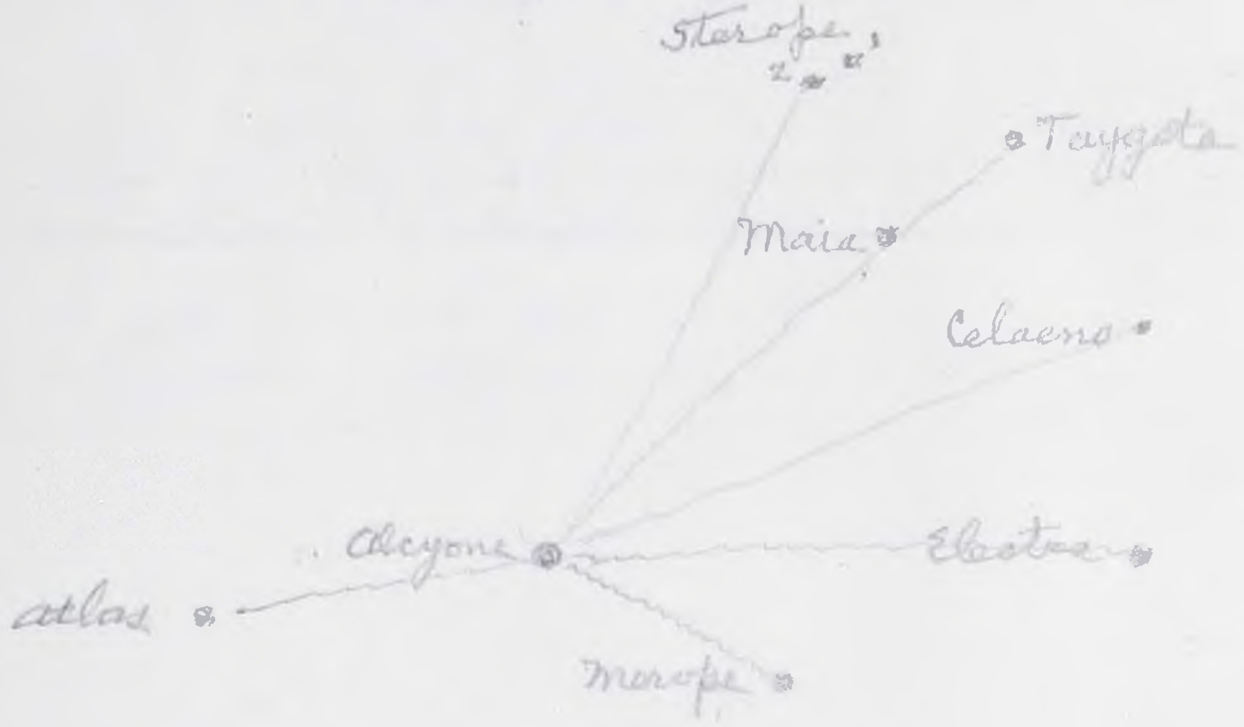
We now turn to the other group, the Pleiades, whose main stars are named-- Alcyone, Electra, Celaeno, Maia, Merope, Taygeta and Sterope. Atlas, the most easterly one is the father of the other seven, and we shall discuss only the first and the last since they seem to be the most important members.

Alcyone in Árabic means King-fisher and it is difficult to understand how it could become the leader of a flock of doves. It was once believed to be the centre of the entire universe, but that has been disproved long ago. It is a third magnitude star, the brightest of the seven sisters and a visual double. It is also a B type star and very hot. It is 233 light years away and is receding at 7 miles per second, while its annual proper motion is .053 seconds of arc.

Sterope was the wayward, black crow of the family who fell in love with a mere man and was therefore disowned by the rest and gradually faded out of the picture but can still be seen with a small telescope.

This is the constellation where the famous gaseous Crab Nebula was found by Messi
167 some years ago. It is called Cluster 1157 but is not a cluster in the proper sense. It is just above zeta and is thought to be the shattered remains of an exploded super nova which has'nt quite finished its catastrophic detonation of atomic energy. It is about 5000 light years away, and yet may be seen with a medium telescope because at its centre there is a fine double star of the 15th magnitude.

W.G.Colgrove.



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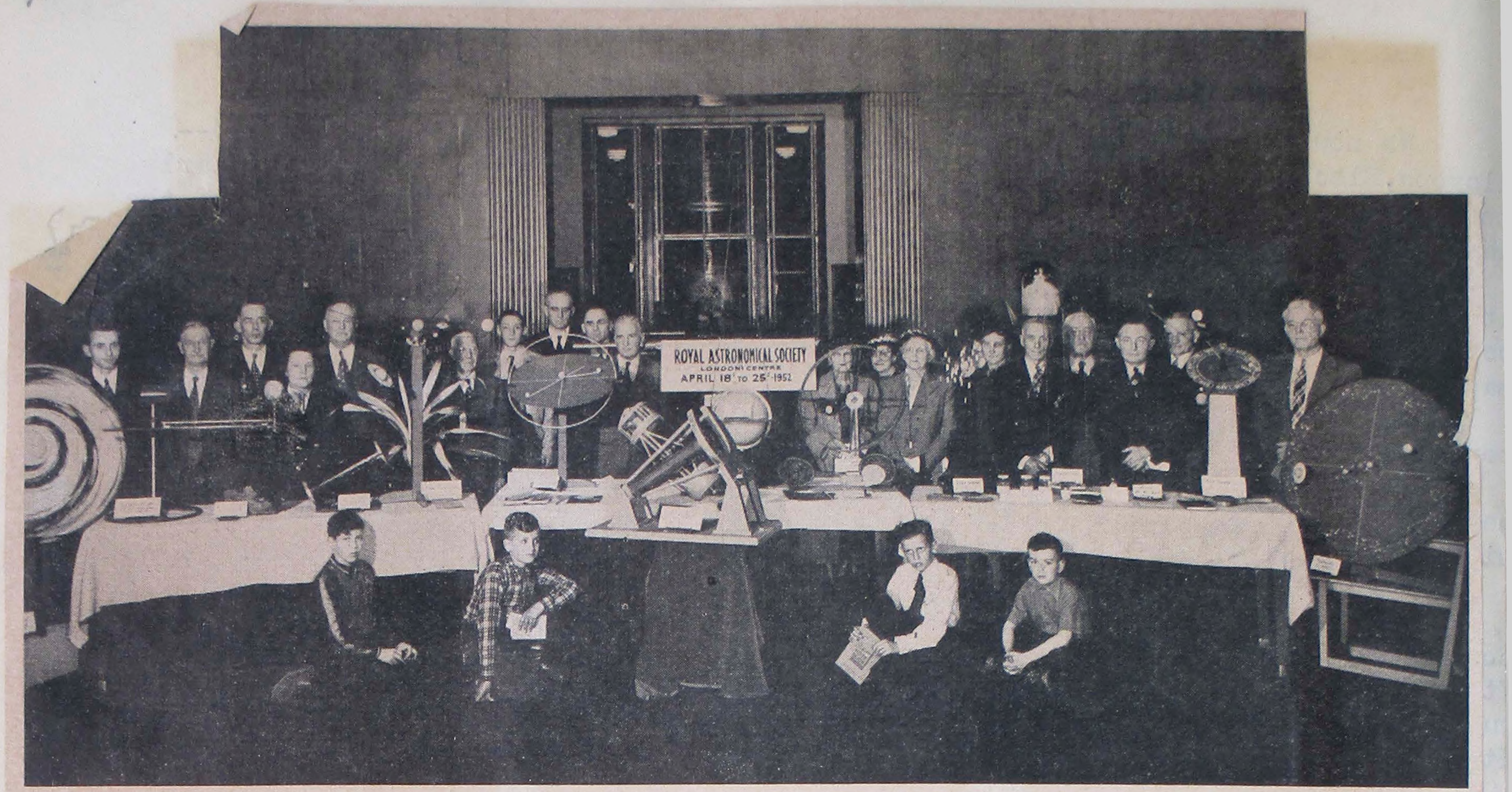

Exhibit of London Centre, April 1952. ~~For names see p. 172.~~

From left to right the names of the members in the photograph are: Gordon Graham, John Middlebrook, R. H. Cole, Miss S. Bosshko, H. R. Kingston, W. G. Colgrove, A. Schoenfeldt, Henry Schoenfeldt, George Walden (President), E. Fanning (next appears the sign), Mrs. Alice Davies, Mrs. Bernard Johnson, Mrs. W. G. Colgrove, Mrs. Henry Schoenfeldt (behind model), Mrs. J. C. Higgins, E. E. O'Connor, R. E. Winters, G. R. Magee, J. C. Higgins, W. H. Adamson.

Almost as important as the names of the members are the names of the instruments. From left to right they are: The Galaxy, the Sotellunium, the small Reflecting Telescope, the Manual Planetarium, the Planeto-zodiac, the working model of the 200-inch Telescope, the Portable Foucault Pendulum, the Static Ecliptic, the Stellar Radiant, the Planetary Paths, the Motor Planetarium, the Larger Planeto-zodiac with all the planets attached.

The staff of the Observatory has received several honors. It was a red-letter day for us when Dr. Kingston was asked to deliver the astronomical lectures at the great Franklin Institute in Philadelphia and we were also asked to send some of our instruments for display and demonstration.

For some years we have been asked to look after the display of several University departments at the Western Fair.

In my courses at Mc.Gill University I was announced as a Prize man of that well known institution and was given the annual prize in Philosophy.

And recently when I retired at Western I enjoyed the unexpected honor of receiving the beautiful Silver Tray for devoted Service.

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1948

Astronomical Laboratory

California's 200-Inch Telescope Proves Unique In Many Respects

By W. G. Colgrove, M.A., B.D., U.W.O.

The story of the Hale telescope began in 1923 when Dr. George Ellery Hale, then head of the Mount Wilson observatory, found it necessary on account of ill health, to give up his work and hand over the directorship to Dr. W. S. Adams.

In the hands of such experts as Hale, Ritchie, Pease and Hubble, the 100 inch instrument had done its best in plumbing the depths of space and in bringing back photographs and observational data that surprised and inspired the world. The inadequacy of that great machine to solve the problem of the apparently expanding universe made astronomers think of a much larger one and Dr. Pease drew up tentative plans for a 300 inch monster.

Dr. Hale wrote to Dr. Day of the Carnegie Institution at Washington to ask about the possibility of casting the blank and was told that it could no doubt be done but that it could not be transported over the weak bridges and through small tunnels across the country. Dr. Hale then asked for a 200 inch blank and also contacted the Rockefeller Foundation in New York for funds. After much traveling and many conferences he was finally assured by both organizations that they would make a grant of $6,000,000 to build and equip the giant observatory and telescope. They also commissioned the California Institute of Technology to supervise the project with Dr. Hale as chairman of the Institute Board.

Then began the costly experiments with fused quartz as a substitute for glass in mirror blanks but after several months the process was given up as far too expensive and unpromising. This experiment was worked out at the great factory of the General Electric Company in Lynn, Massachusetts and was under the direction of the famous Dr. Elihu Thomson, head of their research department.

Dr. Thomson was my close neighbor and showed me the earlier phases of the experiment and promised to give me a 9 inch optical set of lensds for Western but before we were ready to accept them they went to a small American college.

The Institute Board now turned to the Corning Glass Works at Corning, N.Y., where the 200 inch blank and several smaller ones were successfully cast. As the years passed the incessant strain of the task undermined Hale's strength and he was forced to resign in favor of Dr. Max Mason the director of Natural Sciences of the Rockefeller Foundation. After ten years of failing health but unfailing interest in the great project, Dr. Hale passed away just ten years before the completion of his heart's life-long desire. It was dedicated last year. 1948

* * *

The search for a locality with good seeing conditions was made by Dr. John Anderson and a small group of aids who traveled from place to place with some 12 inch reflector telescopes and several other instruments including barometers, hygrometers and cameras. They finally decided on Mount Palomar which means dove cot and is about a mile above sea level.

The geological conditions are unusual in that the site is on a great granite hog-back 10 miles wide, 30 miles long and 25 miles deep. From the meteorological point of view it is ideal and local conditions are free from city lights, automobile beams and heavy fog, and the grounds and roads were soon put into good shape.

As soon as Dr. Anderson had picked the spot I wrote him to beg one of the 12 inch reflectors but he replied that they had a full program already laid out for those instruments but hoped we might find one somewhere. And we did.

Later the World War II broke out and work on the whole project was stopped for four years while the mirror and its accessories were protected from those far-flying Japanese bombs and local sabotage. The spacious dome had been begun and was soon completed after hostilities ceased but it had to wait for some months for the installation of the mounting and mirror. The location is 125 miles from Los Angeles and 80 miles from San Diego, California.

* * *

This monster astronomical laboratory is built on the flat top of the large granite intrusion mentioned above, is 135 feet high and 137 feet across, and is in two parts, one above the other. The lower part has gunnite and steel walls one foot apart and 26 feet high, while the dome is over 100 feet high, is formed of half inch steel plates and rotates on 32 four wheeled trucks which are moved by four 5 horsepower motors and button control. The shutter has an opening of 30 feet and there is a 60 ton traveling crane in the top. Three floors divide the interior.

The ground floor has the offices, the darkroom, the air conditioning equipment, the library, lunchroom and storage space; the mezzanine floor has the public rest rooms, electric panel boards, time clocks and oil pumping machinery; the observation floor has the aluminizing apparatus, the public observation gallery and the great telescope with its accessories, passenger and freight elevators run to all floors. The rotating dome alone weighs 1,000 tons.

See Model P. 330-332

The mounting is, of course, at precisely north and south on great cement and steel piers on which rests the carriage for the telescope. This carriage is made in three main parts. The immense horseshoe bearing 4 feet through and 46 feet across toward the north, the thrust, yoke bearing with similar dimension toward the south, and the large twin steel tubular girders, 10½ feet through and 55 feet low in between.

The telescope tube, 56 feet long is swung between these girders on two cylindrical bearings called trunnions through the east one of which the light from sky objects may be directed into the adjacent girder for observation, photography or spectroscopic study. An overall telephone system and a complete electrical connection unites all parts of the great observatory.

The north and south bearings are provided with frictionless oil cushions through which the oil is forced under 250 pounds per square inch. Just beneath the tall north pier there is a large operator's table with its banks of control buttons and switches, and just south of the south bearing there is a constant temperature room for receiving a reflected beam from the Coude diagonal mirror.

* * *

The design of this great telescope is quite unique and is a composite with several changes from the usual types. This we have already seen in regard to the mounting, and when we examine the tube itself we meet with another surprising deviation in the form of a cell for the observer at the prime focus, hung right in the middle of the cage at the top of the telescope where the observer sits 70 feet above the floor. In this cell, which is a steel cylinder 6 feet across and 15 feet high, there is the observing binnacle with its eyepieces and plate holders and, below them, beneath the floor but still within the cell, there are the hangers for the Cassegian and Coude convex mirrors.

If we turn our attention to the bottom of the tube we see the great mirror about 17 feet across surrounded by an iris diaphram which may be raised or lowered to increase or reduce the area of the mirror surface as desired.

Passing through the centre of the mirror there is a steel tube 40 inches in diameter which reaches up to the declination axis where the Coude eliptical diagonal flat mirror maybe attached when required. Then if we go below to see the under side of the mirror, we find that it has a cellular base in which there are 36 specially designed spring devices, each made of 1,100 parts to keep the mirror in proper adjustment. The driving mechanism for the right ascension motion of the telescope is composed of two 14-foot gear wheels housed in the large circular steel casing just below the south bearing, while that for the declination motion is a similar 14 foot gear wheel fastened to the west trunnion.

The optical system of the three best reflecting types were combined: The Newtonian in which the large mirror receives the star's light and sends it back to the prime focus in the obesrver's cell where the image is examined with eyepieces of various powers. The Casegrainian in which the star beam is also reflected, not to an eyepiece but, to a smaller convex mirror which in turn sends it converged into and through the small tube that passes through the large mirror and on to an eyepiece below. The Coude, or elbow type, in which the light from the big glass is turned back to a similar convex mirror of different focal length which returns it to a flat eliptical diagonal mirror attached to the top of the small tube already mentioned and thence at right angles through the east trunnion to an observer in the girder; or the diagonal mirror attached to the top of the small tube already mentioned and thence at right angles through the east trunnion to an observer in the girder; or the diagonal may be turned so that the light will be directed through the south side of the tube and through the smaller tube in the south bearing into the constant temperature room mentioned above.

The tube including the mi ror at the bottom and the cag at the top is 22 feet ac[illegible] 56 feet high and weighs 80 ton and when it stands up straigh it is 75 feet high. The mirror originally weighed 20 tons but los 5½ tons by grinding. It is 2 fee thick at the edge and 20½ inche thick at the centre. The grinding process used 31 tons of abrasive and took 180,000 work hour but it is not finished yet.

* * *

No set program has been made public but it will include: The examination of the far reaches of space to something like a billion light years. The photography of stars and nebulae for a solution of the expanding universe. The search for the structure and form of the universe and its probable age. The life-history of the stars and some of the unknown facts about the planets.

THE SUN

1. ORIGIN AND POSSIBLE AGE ---

The dates in the Bible -- A Bishop's errors.
The findings of Geologists -- About 2 billion years.
Astronomical estimates -- Preevolution estimates -- About 3 billion.

2. DISTANCE AND THAT OF NEAREST STAR ---

Average 93,000,000 miles -- The astronomical Unit. A.U.
Nearest star is 270,000 times as far -- 25 trillion miles or 4.28 light years.
Spider web -- One lb.around the earth, 4000 lbs.reach Sun, 1 billion reach Proxima.
25000 box cars in 500 trains with 50 cars each.

3. DIMENSIONS COMPARED TO EARTH ---

Diameter 864,000 miles -- 109 times that of the earth.
Circumference 2,720,000 miles -- Take 80 years to walk around it.
Surface area 2 trill.356 bill.square miles -- 12,000 times the earth.
Volume 340 quadrill.cubic miles -- 1,300,000 times the earth.

4. DESCRIPTION AND FUNCTION ---

Atmosphere -- metalic gasses,dust,meteoric material. 60 earth elements found.
Corona -- dust particles repelled by sun light,100,000 to 3,000,000 miles away.
Chromosphere -- 5,000 to 10,000 miles deep,pink hydrogen and helium mixture from which the Prominences arise 100,000 to 300,000 miles at 100 to 200 mls.per sec.
Reversing Layer -- 500 to 1,000 miles deep,causes black lines in the spectrum.
Photosphere -- The visible surface with its rice-grain tecture,spots and flares.
Sun Spots -- Their nature,appearance,size,duration,frequency,polarityand cycle.
Inclination -- This determines the aim of the spots as we go round the sun.
Rotation -- At equator 24.6 days,at 45 deg. 27.5 days -- 4450 miles per hour.
Mass -- Over 2 octillion tons,332,000 times the earth, BREAK IT DOWN.
Density -- ¼ of the earth, 150 lbs.here = 2 tons there. Attraction 28 X earth.

5. RADIATION AND REPULSION ---

Light -- 3 Octillion candle power per sec. 4 million tons per sec. We receive 58,000 tons per yaar. Light is produced by atomic changes. BREAK IT DOWN.
Heat -- 900 sextillion calories per sec. If the total light could be turned on a sphere of ice as big as the world it would vanish in one second.
Energy -- 500 sextillion horse power per sec. We receive only 1/2,200,000,000 th. of it but that amounts to 230 trillion H.P. 50,000 H.P.in ten hrs. BREAK IT DOWN.
At one cent per k hour the total sun light would cost 1 quintillion dollars.

6. MOTIONS AND ECLIPSES ---

The Sun's real orbit is as yet unknown but it is moving through space toward Vega at 12.6 miles per sec. or 397 million miles per year. Its rotation with the Galaxy at 163 mls.per sec. is accomplished once in 220,000,000. years. The flight of the Sun through space causes the planets to trace helical paths much farther and faster than we have been told in the books.
The eclipses of the Sun are caused by the moon which comes between the earth and the Sun. There must be at least 2 of the Sun each year and there may be 3,4 or 5.

7. THE SUN'S FUTURE AND CAUSE OF ITS LIGHT ---

Heat-death theory -- Second law of thermodynamics --The increase of entropy.
Rehabilitation probable -- Bethe Carbon Cycle -- Changes in atomic structure.
Sun sweeps up 564 million tons of hydrogen,changes it to 560 million tons of helium and produces 4 million tons of light each second. At 1 cent per kil.hour the total light of the Sun would cost 1 quintillion dollars.

THE BETHLEHEM STAR

I. Sources of the subject -

1.Mythology - Babylon,Egypt,Greece,Rome. a remarkable similarity yet a difference.

2.Astrology - All ancient peoples studied the stars for future events.

3.Tradition - The apocryphal writers made much of a coming One with a star as a sign.

4.History - Both political and religious-

(a) Zoroastrian priests expected a star in Virgo as the herald of a royal prince.

(b) The Jews have always expected their Messiah to be heralded by a star. One of their Messianic imposters called himself Bar-cocheba which means son of a star.

(c) The Roman writers Suetonius and Tacitus tell of this very prevalent expectation throughout the East.

5.The Bible - In the New Testament record we find that the Wise Men made their journey under the guidance of a special star. They reached Jerusalem and after consulting Herod proceeded to Bethlehem where they found the object of their search,the royal Prince.

6.Modern Astronomy - Whereby all of these ancient sources have been critically examined,rejected or accepted and finally fitted into a proper scientific frame which needs but an occasional addition to complete the interesting story.

7.The Star - A variety of opinions about the nature of the star have been expressed-some declared it was a specially created star,others that it was a comet,others that it was a meteor,still others that it was the glare of the light which surprised the shepherds.

Dec. 17,'48.

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II. The Contribution of Ancient Astrology -

This was not what we know today as modern astrology but rather a simple oriental astronomical symbolism. Today's crude variety is an intellectual abortion, it is a whited sepulchre, it is an astronomical ape, so rediculous and so utterly pedantic as to merit only the anathema of thinking people. The original had its beginnings no doubt in the formation of the constellations with their names and meanings together with the names of their chief stars and their signification.

Dr. Seiss who wrote that famous book, "The Gospel in the Stars" says that many notable scholars hold this view, i.e. -

Albumazer, famous Arabian astronomer says, "Many ancient writers attributed to these signs a divine and prophetic religious content".

Roberts who debated with Volney the French atheist proved this and Volney admitted it.

Dupius in his "Origin of Cults" presents a great number of traditions from many nations to the same effect.

Dr. Adam Clarke says the Egyptions believed the constellations conveyed sacred messages.

Professor Sayce in his "Chaldean account of Genesis" says that among the Babylonians the constellations were signs of important future events.

Dr. Stanley Faber admits the symbolic connection between the constellations and the Gospel and that they evidently express and reveal the moral purpose of God in providing for the redemption of the race through the death of His Son as depicted there.

All nations knew it for they were invented long before their time by inspired men like ~~like~~ the Hebrew prophets of later centuries.

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III. An example of the story in the stars-

In the very earliest times the order of the twelve zodiacal signs began with Virgo and concluded with Leo just as the Gospel begins with the Virgin and her child and ends with the final triumph of the Lion of the tribe of Judah.

Now,along with each sign there are three related groups each bearing its share of the sign's signification. For our purpose today we need only discuss this first one with its related groups,Coma,Centaurus and Bootes.

According to the New Testament record Jesus was born of a virgin and here in Virgo we see the figure of a woman whose name in Hebrew and Syriac is Bethulah,the maiden; in Arabic it is Adarah,the pure virgin, and in Greek it is Parthenos,the maid of purity. How interesting to find that this virgin holds in one hand an ear of wheat at the same position as Spica the brightest star of the sign whose ancient name Subilon means the seed. In the other hand she holds a branch which is another prominent Messianic symbol whose star is called Al Azal which means Branch. Then the associated group Coma (not Berenice's hair) is a young woman holding a baby boy in her arms and Coma means,the One desired,and is the same word used by Haggai the prophet when he speaks of Christ as "the Desire of all nations". The second associated group is Centaurus, part horse and part man signifying the two natured Saviour,the destroyer and the one who heals. The third associated group is Bootes which means coming Shepherd. The chief star is Arcturus the keeper of the fold and the star in his right arm is called Al Katurops which means Rod. Here then is the first sign of the Christ in the constellations.

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IV. What has Modern Astronomy to add?

After much careful study of all known reliable data the following is tabulated -

1. At midnight at the Vernal Equinox in the month of March, nine months before Jesus was born the sign Virgo was on the meridian of Bethlehem which suggests the announcement to Mary.
2. At midnight at the Winter Solstice in the following December when Jesus was born this same sign Virgo was rising and with it also the three related groups Coma, Centaurus and Bootes which suggests the arrival of the "Desire of all nations".
3. Besides these regular phenomena the annals of astronomy, including the work of Kepler, Fabricius and Pritchard tell us that during a year prior to the birth of Christ there were three conjunctions of the two largest planets, Jupiter and Saturn. These occur at irregular intervals and they do not appear in the same constellation again for 800 yrs. While this was being watched a third planet Mars arrived to add its glory to the scene and thus provide a triple conjunction.
4. An equally interesting fact is reported that these conjunctions occurred in Pisces, the Fishes which was always considered as sacred to the Hebrew nation. It would be rising just as the Virgo sign was setting.
5. Still more remarkable, it is recorded that a new star (Nova) appeared in Coma where the maiden holds a baby in her arms about the same time. It was not specially created but it did help herald the first Christmas and its Christ. ~~It was on the meridian at midnight at V.E. 9 mos before birth~~
6. The planet Venus has often been called the star of Bethlehem and perhaps rightly so for not long ago a modern astronomer made an exhaustive study of its movements back to

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Dec. 17 '48.

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the later years of the B.C. period and found that Venus at its greatest brilliancy was situated in Virgo in the latter part of October B.C.4 which was the year of Herod's death and also that of Jesus' birth. In the latitude of Bethlehem which is only 32 deg. N. the appearance of Venus at greatest briliancy near the feet of Virgo where there are no bright stars would be very grand, especially when one remembers that at Bethlehem the observer is some 3000 feet above the surrounding plain.

Critics say that these Magi were used to seeing Venus and the occasional conjunction and would not be disturbed by them but they had never seen a conjunction in Pisces to say nothing of a triple one, and Venus on this occasion was unique in that she joined the other pagan overlords of mythology to do homage to the new-born Son of God.

Surely such a combination of celestial glory could hardly just happen.

And now in closing may I make a few brief remarks about the journey.

The Magi we understand came from Persia a thousand miles to the east of Jerusalem. Naturally they would follow the ancient Midian road which came from the east into northern Syria to Damascus then farther to the south where it crossed the Jordan to Jenin and skirted the Judean plateau over to Lydda and thence southward to Egypt. From Lydda they would travel eastward to Jerusalem and would report the star as seen from Lydda in the eastern sky.

Have a large star chart. Demonstrate Nova.
Have instruments to demonstrate
and a blackboard on which to draw a map.
(see over)

Have a New Testament.

Dec. 17, '48.

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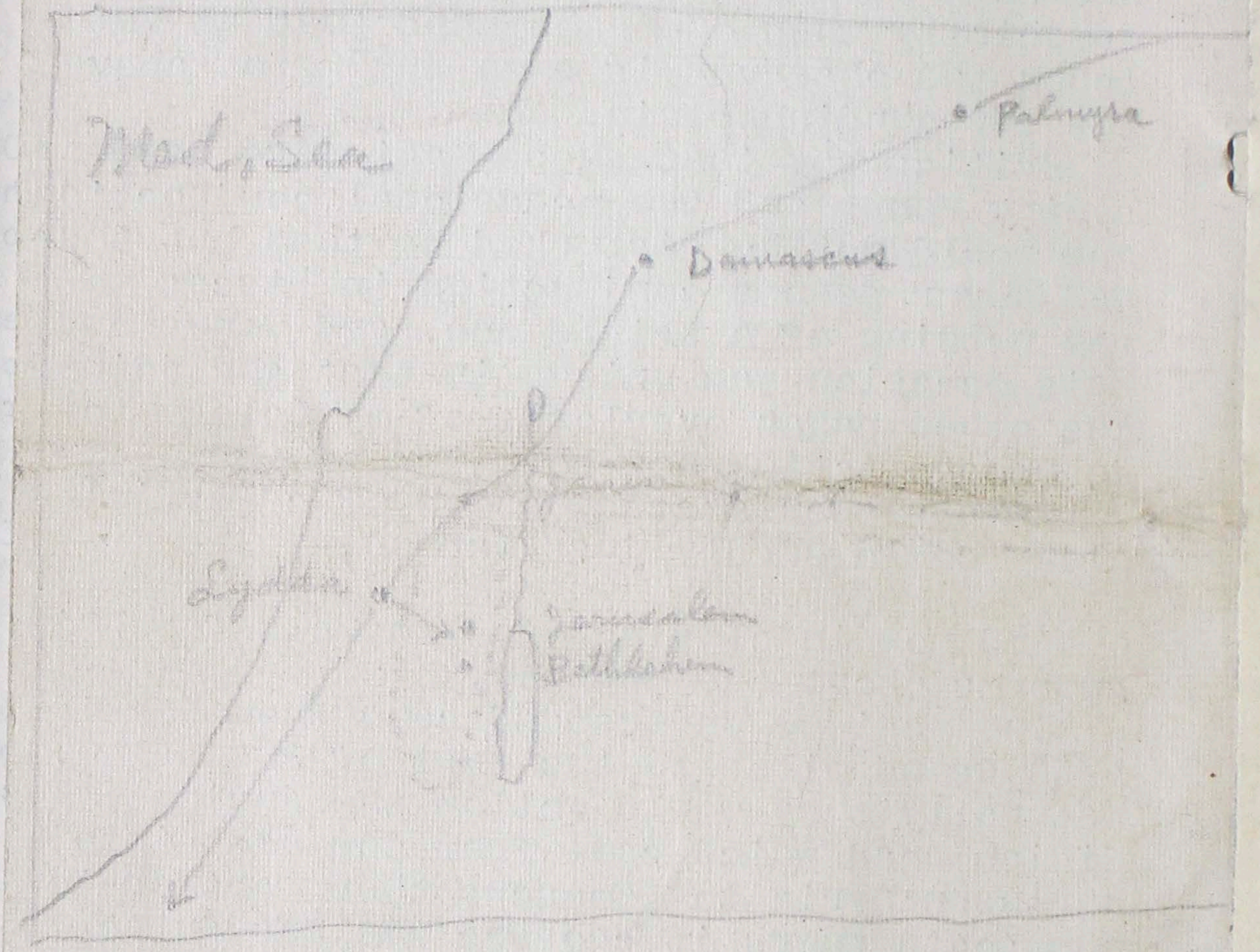
Med. Sea
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106

Different Scientific Theories Account for Bethlehem Star

Dec. 17, '48.

By W. G. Colgrove, M.A.

WHEN ONE SEEKS for the facts that lie behind such a religio-scientific story as The Bethlehem Star it is necessary to play fair with all available evidence. In so doing, one must begin with the first recorded mention of the idea and its related phenomena. The theory that the appearance of an unusual heavenly body always heralded some equally unusual event on earth began so far back that even history itself has not been able to trace it. The remarkable evidence from the meanings of star names has been received by many scholars as being the original basis of the idea.

That was astrology at its dignified best, totally unlike the ridiculous stuff that floods our newsstands today.

The Babylonians and the Egyptians evidently borrowed from this source and the Greeks as well as the Romans simply copied from them, but each of these pagan groups took the liberty to alter the original ideas by subtracting some features and adding others which were more in harmony with their own mythological notions. This was the beginning of what is now called modern astrology.

ty through the atmosphere seems to rule this guess out.

* * *

A fourth suggestion was that a special star was created for that momentous occasion. But that is entirely improbable because there are thousands of stars in that part of the sky, any one of which could have been used for that particular purpose.

* * *

A fifth suggestion was made by the astronomer, Kepler, many years ago when he drew the attention of the world to the fact that there had been a triple conjunction of Jupiter and Saturn in a single year right at that time. But later astronomers have shown that those conjunctions

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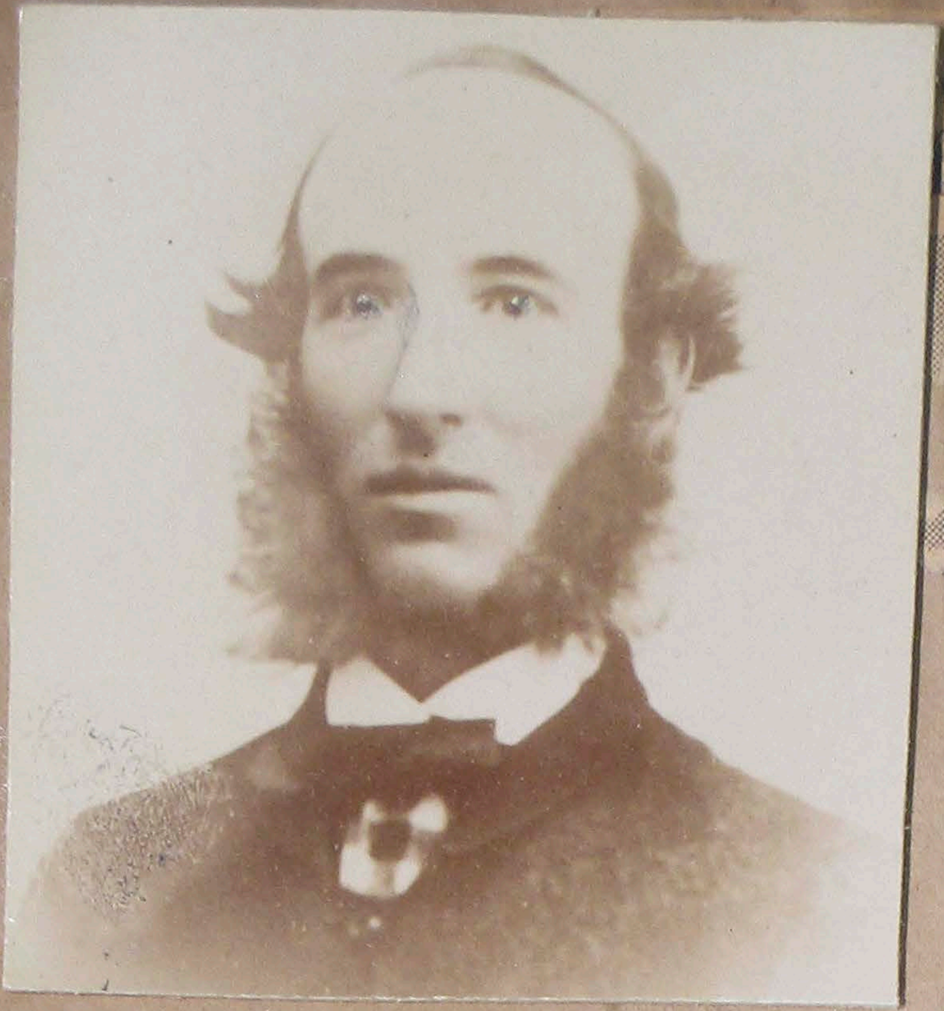
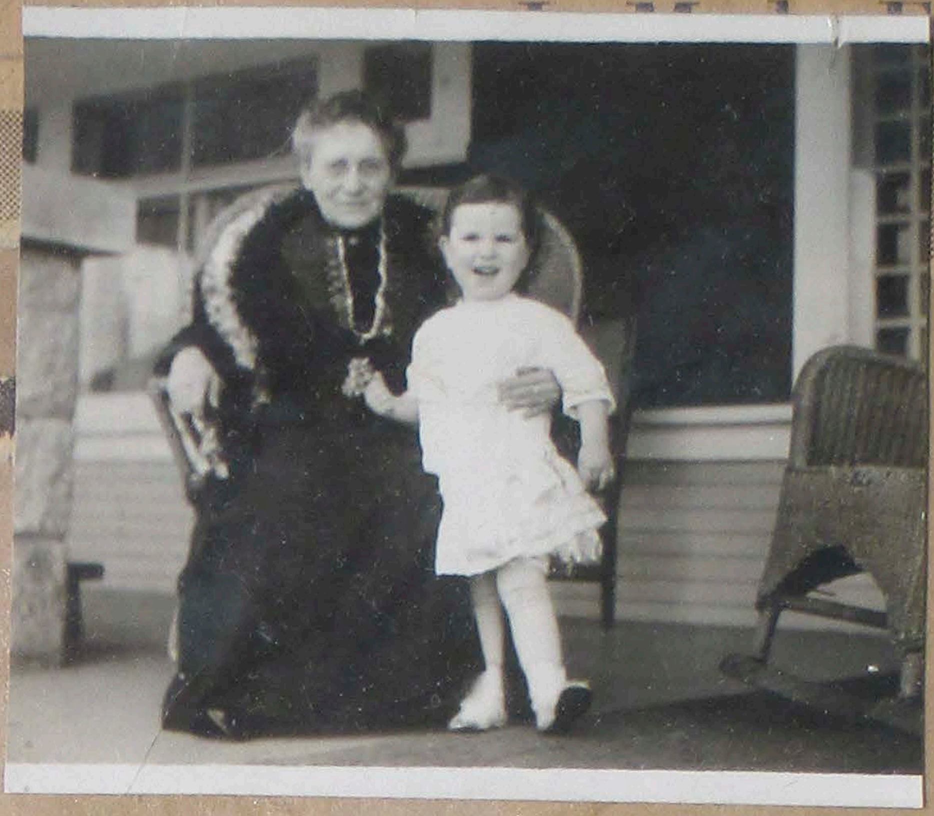
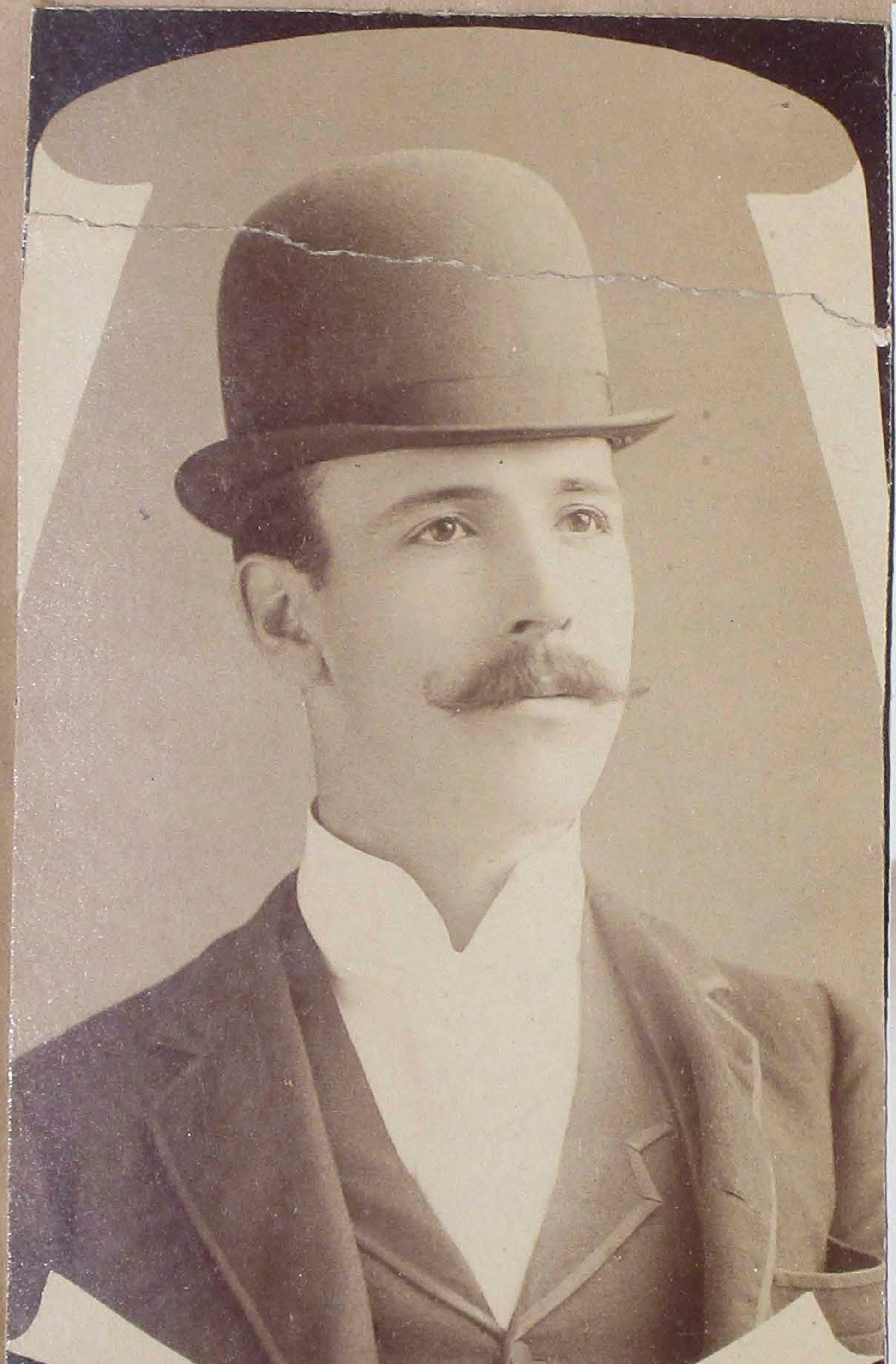
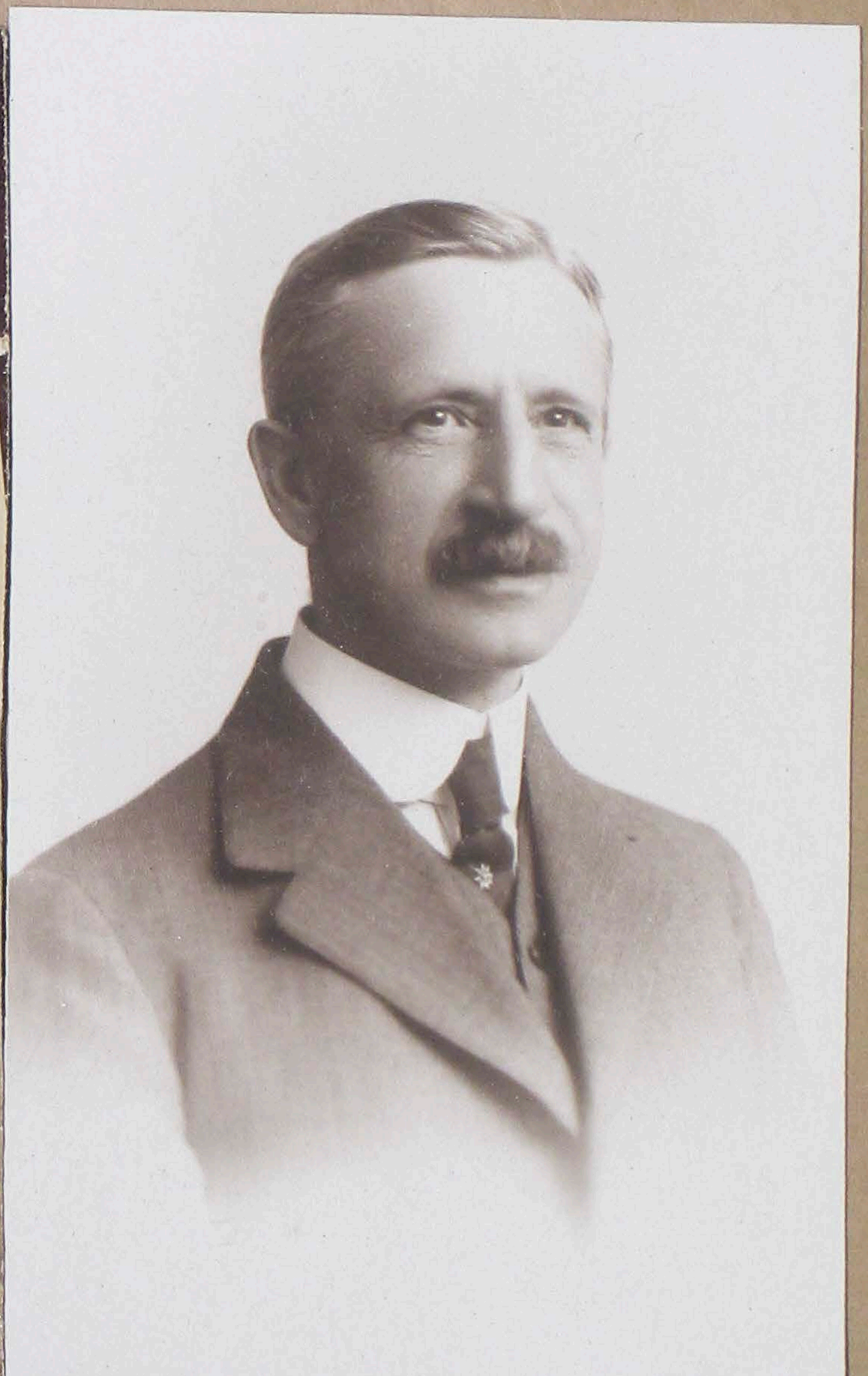




Robert D.Colgrove, Father

Sarah J. Colgrove, Mother





Frederick R. -

Charles E. - a manufacturer in Toront

became a lawyer in Chicago.

AUTOBIOGRAPHY

III

Portrait

111

HIS LIFE begins at

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1872

Commanded by my faithful friend the muse,
I here record what happened to a man,
With gifts divine and willingness to work,
But with no funds to help achieve his plan,
Yet made a real success.

The subject of my inspiration was
A little boy who stepped upon the stage,
The second month some eighty years ago
To make his choice and every foe engage,
Until he won his spurs.

He is not great as some folks measure fame,
But wide experience and much knowledge sought,
That he might have a full and useful life
Of things that must be earned,that can't be bought
With pull or common coin.

His birth was marked by Franco-Prussian peace,
And by the greatest outburst of the sun
Since Queen Victoria received the crown,
Two hundred spots they say,if there was one,
A solar pageantry.

And if you wish to test Astrology,
Just ask some men if they in truth possess
The gifts and graces of the second month,
And prove its silly,futile foolishness
Beyond the slightest doubt.

~~For~~ And there were men like keen Copernicus,
Like Lincoln, Raphael, and our Washington,
And Darwin, Edison and Longfellow,
Like Handel, Galileo, Mendelssohn,
All born in that same month.

'Twas then that Biela's comet should have blazed
Across the sky as it had done before,
But now instead of one bright stream of light,
There came a hundred meteors or more
Each minute by the clock.

One day with open eyes he clearly saw
Two little boys who romped about the place,
They were his older brothers,Fred and Chas.
And aged just five and four.

2.

five
At ~~three~~ his first portrait ~~in rocking chair~~ with clenched fist,
Was placed within the family picture book;
And he remembers well the baby girl
He had to please, and in her cradle rock
Until she went to sleep. (See frontispiece)

'Twas then
~~At four~~ he made mud pies beneath a bridge,
With plan and skill and exercise of mind;
And built fine castles by the winding brook,
With moulded bricks he'd carefully designed
And baked in blazing sun.

ancient
Like most good boys he always went to church
And to an log-built Sunday-School, ~~near by~~,
And later to the larger Wellington
With older boys to learn the Golden Rule
And how to practice it.

That Fall
~~At five~~ he went to school where opened wide
The doors to man's achievements of all time:
And with his Dad on many a hike he learned
The fauna and the flora in their prime,
In woods and fields and streams.

His interest claimed the arachnids as friends,
And soon he had some boxes on a fence,
Each with a spider family keeping house,
Some spinning gossamer, some weaving tents,
And all fine architects.

Then down beside a favorite apple tree,
A leaky tub was sunk for little fish:
And by its side a tiny glen was made,
Where sprites and fairies might obtain their wish
For darksome hiding place.

Close by the barn, three feet above the ground,
Two spacious rabbit hutches stood with stairs
To second storied runways full of straw,
And cosy nests for rest from bunny cares
And fear of cats and dogs.

8.
1872

At six the charm of music filled his soul,
Because a neighbor lad played like a band
On two bright polished midribs from a roast,
And with a jaws-harp in his mouth and hand,
To his supreme delight.

That week his mother listened to his wish,
And took him to a teacher, thinking he
Would doubtless be a virtuoso soon,
If but a chance could now afforded be
To let the muses in.

He often met Art.Stringer over there,
But did not know what universal fame
Awaited him, as poet, novelist,
And lecturer that budding writers claim
At University.

Alas,one day when he was coming home,
He saw a fuzzy cat leap from a fence:
And,thinking it a wild one after him,
Ran crying to his home with nerves all tense,
To tell the awful news.

At seven years he claimed to have the strength,
To wash the windows,out as well as in,
But venturing beyond his reach he fell
Down where a giant cactus tore his shin,
And stained his sock with blood.

And when he gained his feet he also found
His little finger twisted out of shape,
He quickly jerked it into place again,
And rushed ~~inside~~ indoors to have some binding tape
Wrapped round his bleeding wounds.

is world was now expanding very fast,
s street lights reached the city's greater span,
d he recalls the old lamp lighter on his beat,
is little ladder and his large oil can
d chimney polisher.

5 ~~4.~~

One afternoon at three there came a storm,
Dark thunder clouds with fire swept the sky:
Churned by the swirling wind the sand arose,
And fled before it howling,leaping high,
Until we could not see.

His mother called her children to her side,
And in the dreadful darkness prayed to God
That He would stop the storm with,"Peace be still".
And knowing how we feared would spare the rod
And save us everyone.

Then in a frightful moment lightning flashed,
The tempest growled and grappled with the barn,
And tearing ~~screaming~~ timbers all apart, shrieking
Laid them upon the house with little harm,
And we were safe inside.

Once on a summer eve while running fast,
He dashed pell-mell into a water pump,
Whose arm in rhythmic motion up and down,
Struck him across the brow a stunning bump
And threw him to the ground.

His father,standing near,went to his aid
And found him badly dazed and smeared with red;
He washed the wound and bandaged it with care,
Then took him to the house and into bed
For a much needed rest.

One early dawn before the sun was up,
Two thunder storm battalions fought on high
Throughout the day, nor ever ceased their fire,
Until at six both vanished from the sky,
But left a flood behind.

When he was eight he helped his father plant
Some tiny spruces near the broad roadside,
That bears the name of Wellington the great,
And some still stand as tall in feet and pride
As he has added years.

6.
1880

One pitch-dark night he went alone to fetch
A pail of water from the nearby well,
When, from behind a bush, in thoughtless fun
His brother leaped upon him with a yell
And nearly finished him.

He shuddered there from head to foot and wept,
And could not stop, nor hold his trembling frame
The brother slyly slipped away to bed,
While mother sought to share the culprit's blam
For she sent Willie out.

One day a family moved into a house
Across the road and fronting Colgrove Place,
And every Saturday the man came home
So drenched with drink he was a foul disgrace,
Because he lost control.

Soon he would damn his wife and children too,
And slam the doors, and then with brutal force
Throw all the furniture upon the lawn,
And shouting loudly with an awful curse
Jump in a flower bed.

Amazed our lad observed the scene with fear,
And felt within his soul revulsion strong,
So that in later years he fought strong drink
With all his might, backed by a faithful throng
Of sober citizens. (see page)

And when he preached in Massachusetta state
He was elected leader of the Drys,
And hunted those who flouted liquor laws;
Some were so bold he had them dragged to court
Which quickly banished them.

Now father bought a farm quite near Hyde Park
Where Early Joes in great abundance grow
And bright red clover swarmed with busy bees
And silver fishes darted to and fro
In ~~hurried search for food~~.
rapid and bubbling rill.

7.

One day while coming home from school some girls
Were taunting him because he had red hair,
And when he could not hold his temper more,
He threw a stone into the group and there
It smote one on her head.

Inside an hour two officers arrived
And asked to see the boy who threw the stone,
They told him he had almost killed the girl,
That this offense his parents would atone,
And he must keep the peace.

That was not all,a bully picked on him,
And often sunk his knuckles in his cheek,
To show how easily he'd lay him out,
If he should raise a cry or make a peep
Against him at the school.

One morning on the way to school he met
The craven bully on the street and said,
"Don't touch me any more,or by the gods
I'll crack in smithereens your empty head,
And all the boys will laugh!"

That speech was so dynamic and intense,
The big lad gave a second thought and then
Offered his hand,in friendship to the brave
Who called his bluff,and told him where and when
He'd settle their accounts.

At home the place was growing more complete
With many kinds of peaches, plums and pears,
And luscious cherries all around the lot,
As well as apples fit to show at fairs
And grapes of varied hues.

Now these fine fruits set up a strong desire
In scores of boys and girls who knew no fear,
At whom my father shot a watery blast
By means of a large syringe hidden near,
And drenched them to the skin.

7.

Glass
Beside the home there stood no less than five
~~Green~~-houses with exotic plants and roots;
And full of perfumes from the orange trees.
Where blossoms by the hundreds and the fruits
Hung ripe and green festooned.

Among them there were fig trees too in bloom,
And curious cacti from some distant land,
And palms with spreading fronds beneath whose shade
We lounged to read or reached an eager hand
To pluck an orchid rare.

Across the crystal front and glassy roof
Of one transparent house a rose bush grew,
With scores of fragrant blossoms called LaFran
And buds galore all decked with shinning dew,
As mirrors of the sun.

In summertime this was the rendezvous
Of many humming-birds and honey-bees,
And gorgeous moths and pretty butterflies,
All seeking nectar with their flower keys,
And dropping pollen there.

'Twas here our growing lad learned how to catch
The busy bees and moths and butterflies,
But best of all the humming-birds whose breasts
Are so resplendant,and whose plaintive cries
Are made when held in hand.

Here too he learned to call the plants by name,
And how to change them by cross-blending,and
By grafting added three or four to one,
Or made them multiply in dampened sand
From tender healthy slips.

When comes the New Year back again with Spring,
Within hot--houses where the flowers blow,
We light tobacco fires to destroy
The Aphids,menace of the things that grow,
And reproduce their kind.

8.

1881

When he was nine, he can't forget the night,
An awful Indian rapped upon the door
And shouted, "Hungry Ingin me", then sunk
His tomahawk deep in the wood and swore
He'd eat and sleep all night.

The frightened lad turned quickly to one side,
Just as his father came to meet the man
And said there was no room, but thus refused
He raised his tomahawk on high, and then
Began to force his way.

The father now stepped slowly back and grasped
A long horse-whip with which to fight, and when
He struck the fellow's hands, he had to drop
His axe, and ran, and ne'er was seen again;
But no one slept that night.

One afternoon at half past four o'clock
The sky grew dark in haste, the wind arose,
And in a trice a second hurricane
De~~x~~scended on the town with sudden blows
And ruin in its wake.

This time it burst upon the ~~green~~ glass-houses
And swept whole sashes high into the air,
Then dropped them in a thousand bits;
Or tossed them hurtling out of sight to where
We found them the next day.

It struck again some distance up the road,
And seeing two large willow trees ahead
Surrounded them and in its strong ~~vertex~~ embrace
Snapped both their giant trunks midway and fled,
But left their stumps intact.

We can recall the brilliant little man
Whose name was Dearness, still so widely known,
Who, as inspector, used to visit us
To get his meagre stipend for the Moon
From Dad the treasurer.

8.

One fine Spring day when shinny was in vogue,
There was a match held at the Grand Ave.school;
Our subject was so fast, the other side
Schemed hard to bar him from the field by rule,
But failed to make their point.

So, early in the game they changed the man
Opposed to him, and put a stranger there,
Whose job it was to cause him injury
Upon the shins, and so he struck him square,
And put him out of play.

Bent over with the pain and bleeding too.
Our lad limped slowly to the school for aid,
When,suddenly a block was shot toward him,
And,strange to say,it struck him on the head
And nearly laid him out.

120

And now I must relate a stranger tale,
Not of a fish,but of this old world's end,
For it was said that at the stroke of three
The earth would be consumed, the oceans burned
And human life destroyed.

The hours dragged along and recess came:
The boys climbed trees and like so many crows,
Swung on the branches to rel~~ei~~ieve the shock
That did not come, for no one really knows
The time of that event.

~~One~~ That evening just at dusk when Will was with
Some boys, a husky drunken man called Joe,
Came seeking him by name and quickly seized

~~1~~.

That was the time when steamers plied the Thames,
rear The ~~side~~-wheel type so picturesque and trim;
But since that fateful holiday in May,
No one has put a pleasure boat like them
Upon the winding stream.

It was the Queen's birthday around the world:
Two hundred happy souls and more aboard,
When the beautiful Victoria steamed away,
But suddenly she overturned and roared
Like some leviathan.

That evening on the river bank there lay
Two hundred dead who,but an hour before,
Were planning picnics at the Springbank Park
With parents,children,friend and visitor,
A happy holiday.

Like many more, our lad was deeply moved,
When he saw school-mates in untimely death,
And his own cousin lying with the rest,
While weeping people sought their loved ones'neath
The submerged pleasure craft.

That year as well death visited our home,
And snatched away the baby from the fold,
Because there was no help for whooping-cough:
So when it got beyond the doctor's hold
The patient had to die.

And then a fundamental change was made,
Our father bought a larger home and farm,
Beyond West London,then named Petersville,
Where now the Brecia Hall adorns with charm
The place called Sunnyside.

Now it was time for sugaring off again
And we prepared,as every year,to drive
To Lobo Village and to Uncle Dan's,
Where we should all enjoy, oh lucky five,
Our Easter sugar treat.

~~1~~.

One winter day a group of boys at school
Sent Will a challenge to a snow-ball fight;
He chose six lads to make a lot of balls,
Then,as the group came on, pretended flight
To draw their hurried fire.

He turned, and followed by his eager men,
Withhheld their shots until the foe was spent,
Then charged,and charged again with right and left,
by Till ~~with~~ a steady blitz their ranks were rent
And they had to retire.

~~1882~~

This was a time of trouble in the world,
And great men rose to match it with their works;
Among them Gladstone,with the golden tongue
That lashed the guilty Sultan of the Turks
For his inhuman deeds.

He was so great a man that all the earth
Stopped at their toil to listen when he spoke,
For with his power of faultless eloquence
He felled his foes with fulminating stroke,
Like mighty Jove of old.

Then one day,after he had shaken Rome,
Our father said he thought it would be grand,
If Will would henceforth bear the magic name
Of Gladstone, now proclaimed on every hand
The fearless British lion.

That night at suppertime his brothers brought
A gift prophetic of what was to be,
A telescope,no less,of shining brass,
So he could watch the Moon and stars and see
The plumage of the birds.

That was an hour ne'er to be forgot ,
When this young Gladstone proud as father's choice
Began to speak like some great orator,
With haughty gestures and resounding voice
Against imagined foes.

One day in school the teacher saw a boy,
With fingers fastened in a ball of tar,
And shouted,"Henry you come here at once,
I'll make you smarter than you think you are,
With this fine hickory stick!"

The teacher held within his hand a book,
One metal-bound, which he let fly at Hen.
Because he stalled,and everyone looked round:
The book,however,missed its mark, and then
Struck Willie on the cheek.

The lad now felt his face and found the blood
Was trickling down his coat,and left the room;
The teacher followed close and said,"Go home,
I'll see your father and explain to him
The reason for your ~~cut.~~ wound.

Within a month another boy was caught
Right in the act of talking much too loud,
Again the order,"Jimmy Cake come here"
Resounded in the room ,but Jimmy bowed
And sat down in his seat.

Enraged,the teacher stamped and rushed at him,
And grabbed him by his tawny tuft of hair,
But Jimmy would not budge,and in a trice
The teacher got the hair, but left him there,
And then resumed his place.

About this time our budding naturalist,
With several other boys one winter day
Trecked to the dam at lovely Springbank Park,
And crawling far beneath,observed the way
The ice formations grow.

And from there to Jim Foster's open slide,
Or down the hill from Springbank's reservoir
For Moon-light dash and snowy,icey climb,
And down again,a healthy winter chore,
To build one's skill and strength.

It was the year of eighty-three when came
The devastating flood to Petersville,
Where buildings were destroyed,and people drowned
In submerged home or grocery-store or mill;
There was no breakwater.

At suppertime the news arrived to say
The dam had burst,and people ran to where
They saw a wall of water coming fast,
And one man said,"We'd better climb the stair,
Or perish in the flood."

Another shouted,"No,one might as well
Crawl in an egg shell,No,I'll climb a tree."
So up he went just in the nick of time
To save his threatened life,and then to see
His cottage swept away.

Our lad now entered school at Petersville,
And being new and small was picked upon
By boys who did not know his lion-leap,
Nor yet his flying toss,which sprawled them on
Their faces in the dust.

He said he'd rather fight than study books,
And mischief every day with feet and fists
Called for a trouncing with the teacher's stick,
Which raised round welts across his tender wrists,
But he would never cry.

One day a visitor appeared and asked
For apples,and Will threw up a decayed pear
So high and swift into the apple tree,
That its rot-spot flew straight into the ear
Of that poor visitor.

This was so ludicrous and unforeseen
That Will,while digging out the pulp,fell down
With fits of laughter he could not suppress,
Which caused the man to swear and with a frown
He soon forsook the place.

~~11~~.

1882

In early Fall the Western Fair was held;
Balloonists came attired in fancy suits,
And soaring high in air with swinging stunts.
They quick released a silken parachute
And floated down to earth.

It was a thrilling sight we all beheld,
And Will decided he could do the same,
So with a large umbrella,off the barn
He leaped,but suddenly it split in twain
And dropped him on the ground.

When Will was ten we moved
~~That Fall we moved away~~ to Sunnyside,
A London banker's former residence,
With giant spruces standing by the house;
An orchard broad and fields of wide expanse,
And many kinds of flowers.

One autumn evening ere the sun was set,
A comet stretched its tail across the sky,
And as the darkness deepened brighter grew,
As if in splendor it would like to vie
With planets,Moon and stars.

It stayed for months a misty band of light,
A hundred million miles in greatest length:
Then sped around the sun and into space,
Three hundred miles a second in its strength,
The greatest one of all.

One day we boys went to enjoy a swim,
Though Will had really never learned before,
His brothers took him out into mid stream,
Then tipped the boat and said,"Now make for shore"
He did,and learned the art.

The swimming hole was pretty deep and wide
And diving was a common exercise,
So Will became an expert very soon
And carried off the honors and the prize,
With little competition.

1884

At Sunnyside the birds were numerous,
Will thought he would begin collecting eggs,
And in that year secured a nice display
Of many kinds, all marked with proper tags,
And in a glass-topped case.

He now sought unique nests to be preserved,
And scaled a chimney with a pole and scoop,
That he might filch the house of Chimney Swift;
And crept out three slim branches with a rope
To reach a Blue Jay's nest.

One afternoon he climbed a sapling tall,
Because a humming-bird had nested there,
And as he grasped the nest all lichen bound,
The sapling bent,and swaying through the air,
Dropped him upon the earth.

Then came the picnic of the Sunday School,
With races where our hero always shone;
But the committee,this time, called a race
Between a fine young Indian alone
And unsuspecting Will.

They stood in line and waited for the shot,
Our runner's foolish eyes upon the man;
Then suddenly the pistol barked,and with
A mighty leap the Indian was gone,
And Will was left behind.

That year the English sparrows were so thick,
We thought we ought to thin them out a bit,
So William jammed the muzzle loader full
Then sneaking near a group,obtained a hit,
And gathered just sixteen.

And now our subject tried to smoke cigars
But he got deathly sick - the foolish kid,
Then crawled beneath the barn and took a drink
Of lager beer the hired man had hid,
But it just made him worse.

1885 -- 1886

At Sunnyside we built a large hot-house,
With gaping furnace and a chimney tall,
And in the furnace pit we boys reclined,
To talk about the sweetest girl of all
And bake apples on the coals.

One Saturday while working in the place,
Will heard a quiet,smothered,gurgling sound,
'Twas his little sister drowning in a barrel
Where she had dropped her doll,and trying found
She could not rescue it.

The water was not very deep at all,
But she was head-first in,and would have died
Had no one happened in the place just then,
To hear the noise,and to have stoutly tried
To pull her up and out.

One Sunday afternoon when with a group
Of boys returning home from Sunday School,
He climbed a picket fence for russets rare,
And turning to descend,the little fool
Was caught by his coat-tail.

That was a sight to make the fellows laugh,
As each one tried to free him from the fence
To no avail, until he gave a jerk
And ripped his Sunday meeting coat,and thence
Fell headlong in the grass.

This was his hobby age,and like a boy
He gathered cancelled postage stamps galore,
And shells,and pictures of the nations flags,
And butterflies and bird's eggs ever more,
And read geology.

One afternoon his sister had some friends
As visitors upon the lawn for tea,
But Will was shy and he would not attend,
So all the girls decided they would see
And kiss the bashful boy.

1887-1888

One glorious summer day at four o'clock,
A brilliant ball of fire cut the air
And burst with blinding light and thunder clap,
And then continued westward with a flare,
But it was never found.

That year the circus came to town and Will
Was there to see the clowns cavort and leap
High over elephants, and while in air
Turn summersaults,and falling in a heap
Bounce to their feet again.

This was another challenge for our lad,
Who thought that he could do as well as they,
So built a spring-board in the barn at home
On which to practice many times a day,
And land upon the straw.

After a month or so of steady work,
And careful timing of the summersaults,
He called the boys to see what he could do;
And dazzled them with several double vaults
And claimed he could do more.

They shouted their applause and clapped aloud;
He climbed aboard the spring and made a leap,
And summersaulted twice,but failed to make
The third, and landed in a crumpled heap,
And almost broke his neck.

One autumn evening in the harvest time,
While bringing in the last remaining crop,
A clap of thunder scarred the horses and
They ran away and smashed the wagon top:
But Will held bravely on.

That evening as the sun went slowly down,
The boys returned the horses to the field
And Will forgot the clothes-line on the way,
Which caught him at the neck so he was reeled
And toppled to the ground.

~~25.~~

1889 - 1890

In eighteen eighty six our lad was in
The entrance class, and yet he could not share
That coveted award, for circumstance
Decreed that he should stay at home each year,
To help about the place.

For four long years he had to go to school
In the same class, then stop and work at home,
So that he could not try, but then at last
He was allowed to go, and safely passed,
But could not enter High.

That Fall he went to learn the Graphic arts,
With Knowles and Co. for he had special skill,
And in five years apprenticeship attained
The mastery of form, and could at will
Sketch anything he wished.

To reach this printing plant he had to walk
From Sunnyside right into town, and back
Again at night, and many nights it was
So dark he could not see the beaten track
More than a foot ahead.

The second year they moved to London South,
Four miles from home, yet William kept right on,
Through mud and rain, through heat and cold and snow,
Sometimes he would reach home so weak and wan
He didn't care to eat.

About this time our subject sought to learn
How dynamos and motors made and used
The strange electric energy to make
The light and heat and power it produced,
To lighten all our loads.

He soon learned how to build a battery,
And then a belt and an induction coil,
And did not stop until he made as well
A large glass-wheel machine, with foil
And crank and brush and comb.

In eighteen ninety, he can ne'er forget
Those strange momentous moments, when he faced
The question of his soul's eternal peace,
And what to do with Christ, and how he paced
The floor and fought it through.

And then he felt the call to go and preach
The Gospel of the gracious Son of God;
But education always needed funds,
And fifty cents a week was all he made:
And so he had to wait.

But he had waited four years to a day,
To try his entrance, and forget suspense,
So now he pressed for a much higher wage,
And it became a solid hundred cents
Each week he walked and worked.

He saved and went without and borrowed too,
Until he bought himself a safety wheel;
And then one morning as he passed his girl,
His cycle slipped and toppled down the hill,
While he sprawled at her feet.

One moonlit night he tried to pass a man,
Whose humpback swayed right then into his path,
The wheel stuck tight between his bandy legs,
And William climbed the old man's hump and both
Plunged headlong in the ditch.

About this time the art school tests were held,
And 'though he never could attend a class,
They wanted him to go and try his skill
And were amazed to find he made a pass
And won the prizes too.

That self-same year the county bowed again,
Beneath another hurricane so wild
That many barns were wrecked, and William saw
Our barn roof torn off and quickly piled
Upon our only cutter.

1892 - 1893

This new success marked him as worthy of
Official place, and so without ado
Was secretary of the Artist's Club,
Forerunner more than sixty years ago
Of the Western Art League.~~of Art~~.

Port Stanley was a favorite picnic ground,
And swimming there was practiced more and more,
So youth of every size and shape and age
Splashed in the lake or lay upon the shore,
Beneath the summer sun.

One evening when the Moon was shining full,
And spread a golden carpet to the beach,
We boys and girls together waded in,
And Maisie went so far she could not reach
The bottom with her feet.

She sank from sight and then put up her hands,
And waved them as she held her fleeting breath;
Will saw her plight and plunging underneath,
Brought her to shore, back from the jaws of death,
But never got reward.

It was the year that the Chicago Fair
Surprised mankind with wonders old and new;
And Will decided with his meagre funds,
That he would go and see Chicago too
And meet his brother Fred.

While there he made a book of sketches too,
And wrote descriptions of each wondrous thing
That stirred his soul with unrestrained delight,
And made his eager mind attempt to wring
The secret out of it.

In Chicago Will observed a giant throng
All crowding in a spacious theatre,
Where bill-boards said a great evangelist
Was to preach about the Apostle Peter,
He was D.L.Moody.

1894- 1895

When he returned he daily filled our ears,
With stranger stories than in fiction books,
Till father got the notion he should go,
And in the Autumn he spruced up his looks
To have a holiday.

We bade him fond goodbye,but little thought
That in the dawn a double wreck would slay
Some twenty-eight of those who rode with him,
And maimed a hundred more in such a way
Some wished that they would die.

At Battle Creek the trains had met head-on,
And father although dead was burned as well;
We hastened to the scene and hunted long,
Before we could decide or even tell
Which charred remains were his.

At last we thought about his crooked toe,
And on examination found it there,
So we were soon allowed to take him home,
Not having visited the famous Fair
Nor yet his waiting son.

That very Fall we sold dear Sunnyside,
Then packed a thousand things and moved to town,
Where now the children had a better chance
To go to school, or go together down
To the West London church.

At twenty-~~three~~ two Will made a trip down East,
To see old Boston where they dumped the tea,
And Bunker Hill,and out to Crescent Beach
To swim his first time in the briny sea,
Surprised that it was salt.

While there one day he took a walk for miles
And lost himself amid the crooked streets,
Then asked a stalwart cop if he could tell
Just where he'ed find the Parker House retreat,
He pointed,there it is.

1896-1897

When he returned he found his brother Fred
Had come to London for a holiday,
To build and test some gliders in the air;
So they worked in a barn upon the hay,
Behind their cottage home.

At four o'clock each morn they took the thing,
North of the city where the breeze would waft
Them up and down, but it was mostly down,
While Wrights attached a motor to their craft
And quickly zoomed away.

The end of his apprenticeship was near,
And he must seek employment anywhere;
From Rochester, New York, a letter came
Announcing a position open there
That he should come and see.

He did, and then became the foreman too,
And later tried a water-color test
For a Paris Perfume Company of France;
The artists of the city did their best,
But Colgrove won the prize.

This made the others so chagrined that they
Sought to get rid of him without a trace,
By threats and pressures of their Union chief,
And by a Union visit to his place,
But all to no avail.

Meanwhile he studied illustration in
The famous Athenaeum School of Art,
And did so well in sketching (pen and ink)
That he received a drawing of Saint Marks,
The ornate church of Venice.

'Twas there as well that he conceived the plan
Of having paper faces quickly made,
Of both the presidential candidates,
A party sign that each man on parade
Should wear with special pride.

The orders came requesting thousands more,
Alas, the firms who work in paper mash
Could not supply them in required time,
And so the million fortune went to smash,
And never was revived.

One summer eve while writing in his room,
Two parsons called to see him,they had heard
That he was reading every night alone,
And felt the call to preach the sacred word,
But had no high-school grade.

To make the story short,the upshot was
That they then promised him some work to do,
If he would go to their church boarding-school
At Lima,where he'd find the teachers who
Would plan his future path.

At stroke of twelve one February night,
The shout of fire rang throughout the halls,
And all the boys were trying to escape
Through broken glass and down four-storied walls
Mid choking smoke and flame.

Our student felt the floor becoming warm,
And gathered his belongings in his trunk,
Then threw it out the window by main strength
And leaping,fell upon his hand caplunk,
And dragged his trunk away.

In two short years he covered all the course,
Been artist, poet, speaker of his class,
Had built the Leghorn rooster six feet tall,
And graduated with an honor pass
And Webster's Unabridged.

Before he left,the board requested him
To stay and make his college Middletown,
That they would loan him without interest,
The needed funds,and this they would put down
In legal black and white.

1900- 1901

But Will refused and once again came home,
And soon was foreman of Ontario Lith.
But just at Christmas time it was burned down
And he began his course in Western with
Three months already gone.

'Twas lack of funds again that bothered him,
And then his brother Charles found him a job
In Montreal,but soon the owner failed,
And Will was out of work,and this played hob
With his supply of cash.

But he at once designed a new lamp shade
For factory workers,and he made more dough
Than at his trade,yet sought a better place,
And found it at the Montreal Litho.
Where he remained two years.

Three times that year the reaping spectre Death
Stalked him, once on the mountain's granite brow,
For as he climbed his foot-hold gave away,
And he would have fallen on the rocks below,
Had he not grasped a twig.

Another day while crossing old Craig Street,
A runaway approached him very fast;
The people yelled, he rushed with all his might,
The horses touched his coat tail as they passed,
And Death was foiled once more.

And yet again the spectre followed him,
Like Nemesis as classic stories tell,
This time it was a shipping case that slipped,
From someone on a higher floor and fell
In pieces at his side.

When first he went to Montreal to work,
He grew a Vandyke beard and moustache too,
And tossed his auburn hair back on his head
To show he was an artist like the few
Who dared to do the same.

1902- 1903

Then back to Western for a second year,
And in the Summer sold a doctor's books,
And preached all year at High Street Mission church,
And in the Fall returned to Litho. works
In grand old Montreal.

At the Royal Canadian Academy
He sketched the human models every way;
At National Monument of Design
He studied modeling with a sculptor's clay,
And won an annual prize.

When classes closed the teacher said to him,
"Don't waste your time in wearing cap and gown,
But stay with me,and you will teach this art
And still design for any firm in town,
And be a sculptor too."

But Will refused,and with his brother Mark
Went through the West and saw the prairie crop,
And climbed the Sulphur Mountain close to Banff,
Above eight thousand feet,and took its top
And brought it proudly home.

While coming down the Mount they heard a noise,
As though a stag or bear were on their track,
But soon they saw it was a loosened rock,
Which hurtled headlong just behind their back,
And down a deep ravine.

When they had landed safe below, and still
Above the town, Will found he'd overdone
And had to take the train to Vancouver,
Where he could soon be operated on
For painful hemorrhoids.

At Revelstoke while waiting for the train
He chanced to meet Will Saunders,London man,
And early the next morn was wakened by the
Crows that fought for refuse from the cans,
And left them worse than dogs.

1903

When this was done and he was well again,
He visited the famous Stanley Park;
Swam in the ocean at a pleasure beach,
And brought some water as a sure mark
That he had seen the sea.

At that year's close the busy litho firm
Appointed him as foreman, and quite dumb,
Suggested he should quit his college course
And stay with them, and in a year become
A member of the firm.

But he refused again, and in Mc.Gill
Won highest grade that Composition has,
And special marks in microscopic work,
And the Board of Governor's annual prize
In two philosophies.

His holiday was spent in visiting
The Adirondack Mountains, on the trail
To Exposition Pan American
At Buffalo, where he saw the mitred rail
He fashioned years before.

From there he went to see the Falls again,
And thence to London for a little spell;
And a reunion, then to Lindsay town
To see his college friend who had been ill,
But he was not at home.

Upon inquiry he learned from one near by
That Wes. was fishing somewhere on the lake,
So jumping in a boat Will rowed a mile,
And found him sitting pretty, wide awake
With his own fiancee.

That Fall saw Wes and Will return to school
For their last year of B.A. concentration,
And for a careful estimate of yearly costs
Of food and fares and college education,
And chime of wedding bells.

1904

When he arrived in Montreal that day
He met the girl he thought might be his wife,
But when she said she crawled beneath the bed
When e'er it thundered hard, he felt that life
With her would not be sweet.

While at his studies he was president
Of young folks in St.James United Church,
And led a band of youth,The Solid Ten,
And when he was about to leave was urged
To be assistant pastor.

But he refused, theology was next,
And he would later go to Boston U:
Meanwhile he met the girl that captured him
And promised to be his, when he was through
Three years theology.

And now he preached in many little towns,
And led a male quartette of college chums,
And went on field-trips in geology,
And helped at Brewery Mission in the slums,
And saw the Devil's Garden.

One day he got a note to see a prof.
Was told that he had failed Zoology,
And answered that he did not care to learn
How much a man is like a Chimpanzee
Or any other beast.

The teacher then looked very cross and said,
"You'll have to learn it if you want to pass;"
Of course he would not lose his Arts degree,
And in the end stood highest in his class,
For he had learned it well.

This was a time of struggle to the last,
A happy struggle since great things were planned
And we had health and laudable desire
Since we sought ends alone divinely grand,
Within the will of God.

1905

Then came his graduation at Mc.Gill,
And as he took his parchment was acclaimed
Amid the throng in Convocation Hall;
He lowly bowed his head, and then was named
A Prize Man of Mc.Gill.

This signal honor filled him with delight,
And his professor in philosophy
Said he was proud of him,and hoped he would
Take lots of time to read philosophy,
As well as preaching truth.

One gorgeous summer evening after work,
He and his sweetheart sought the Mountain side,
And though the darkness came they still remained,
But soon a mounted ranger them espied
And they must go to jail.

But Will stood up and said," Now wait a bit,
You don't put folks in jail when they are wed",
To which the cop replied," It's past the time",
And with his lantern sized them up and said,
"·Get out of here or else".

At length our student's future plans were made,
And in the Fall he went to Boston U.
With Sammy Irwin,who had been with him
Some years before in Lima boarding school,
As happy rooming mates.

When they were settled in their new abode,
Will got a job in a large restaurant,
He served ice-water to the guests and thus
Earned all his meals,and then without restraint
Grew fatter every week.

In Boston there was much to see of course,
The Library, Museums and the sea,
The Sculptor's workshops and their taste in art,
The Lincoln statue, Harvard's Varsity
And the State House Golden Dome.

~~38.~~

1906-1907

While busy with his theologic course,
He was assistant in the Boston Club
Which held its meetings in an unused hall,
For slum-bred boys of Massachusetts Hub,
Almost a thousand strong.

One torrid summer day a monster tank
Of black molasses burst and worse than mud,
Flowed down the street and into homes and stores,
Entrapping dogs and people in its flood,
And causing endless fun.

The years soon passed and it was time to wed,
So he returned to By-Town for his bride,
And then right back to Boston the same night
Of San Francisco's terrible rock slide,
Close by the Golden Gate.

In early Spring they went to their first charge,
The church at Ayer in Massachusetts state;
But he continued work at Boston U.
Until another year had met its fate
And he was nearly through.

The day of ordination then arrived,
And he was made a minister complete,
And sent to serve a church down by the sea,
With fisher folk and millionaires replete,
At Swampscott on the rocks.

Through all these months he was preparing still,
His thesis on the Fact of Moral Law,
And then received his Master Arts degree,
From Western U. in London where he saw
His first of college days.

At Ayer they found a fine large room with meals
And went each noon to gether [illegible] Place.
And Will trained into Boston every day
To complete his theologic course as due.

~~3~~.

1908 -1909

To Indians,Swampscott means,the ruddy rocks
Which stud the beach of Boston's swank north shore;
When they arrived they found no parsonage,
And had to raise the funds,and what is more
They bought one very soon.

Will begged the money from the millionaires,
And then from merchants in the city Lynn
Obtained the furnishings of every kind,
All freely given, so when they moved in,
They lived in luxury.

Their neighbor was a noted scientist,
Professor Thompson of electric fame;
Their friend,a millionaire,supplied the funds,
That on Cape Cod they might together claim
A happy holiday.

At last the graduation day arrived,
And Will received the coveted B.D.
And then was urged to stay and to complete
Some further studies in philosophy,
But he desired to preach.

One very early morn at ten to two,
When wild geese chattered on their chartless way;
Or were they storks that left behind a babe?
For very soon one heard the nursemaid say,
"Thank heaven,its a boy".

They hoped and prayed the first might be a boy,
And here he was a living paragon;
They thanked the Lord and pledged new loyalty,
As they began the task they'd taken on-
To rear a soul from God.

In August nineteen nine the treasure came
And straightway found his place in every heart,
And for his gentle mien was called a prince,
Because he always sought the better part.
And merited the name.

1910--1911

In 1910 they moved to Holliston,
And Annie took the boy to Ottawa,
Instead of sleeping he cried all the night,
Although she carried him,like any Ma
All up and down the coach.

In that same year they saw the glowing form
Of Halley's Comet,in the month of May
Go round the solar sphere and into space,
From earth some fifteen million miles away,
Yet we passed through its tail.

One glorious summer day the Boston press
Announced Claude Graham White,in airoplane,
Would land at Quincy Field, and so Will went
To see him flying swiftly o'er the main,
And gliding to the beach.

It was a thrilling sight for one to see;
Vast throngs had come to see him make the grade,
Ten thousand eyes were strained to glimpse the plane
And then to cheer the man,who first had made
A flight from ship to shore.

This moved our preacher to invent a toy
He called The Red Bird with its spool and string;
He made a basket-full and in a Boston store
Showed how they'd fly,and quickly sold the thing
To a small toy concern.

While there they feasted on dame nature's wealth,
Because not far from town there was a field
Of low blackberries on a sandy,slope,
Ten acres broad and with a splendid yield
From which to fill the pails.

One night while comming from the village store
They saw four screaming children locked at home
By thoughtless parents who had gone to lodge
Supposing they would play while they weregone,
But fear crept in apace.

1912---1913

And now they moved to lovely Worcester, Mass.
A college town a quarter million strong,
With great industrial plants and many parks,
Where Grover talked with Burbank till the gong
Said it was twelve o'clock.

The parsonage was spacious to a fault,
And there it was that Ada saw the light,
And her Aunt Ada played nurse for a month,
And washed and baked and made the beds just right,
And served delicious meals.

'Twas there Will sold his church to wealthy Jews,
And bought a new location farther East,
Where soon a brand new parsonage and church
Were built, and it became, to say the least,
Third largest in the place.

And then he made advances to a church,
And joined its group of members to his own,
While all the city wondered at their speed,
But that was largely due to Deacon Stone
Who led the other board.

When Conference convened one April day,
The bishop wished to hear about the cause,
And when the Superintendant did report,
The preachers gave tumultuous applause
No fewer than five times.

Young Rogers now was nearly four years old,
And needed much more boyish exercise;
His dad designed for him the Victor car,
And sold the rights to a large enterprise,
The largest in the world.

And for his Sister Ada, Dad designed
A curious set of blocks called Funny Face
With which she built a woman and a man,
And little boy with hat and gun and case
Just like a Rover Scout.

30.

1914---1915

This was the year the German war began,
And caused the death of millions by its wounds;
Starvation stalked the land, and dread disease
Ran rampant o'er the world, until the Huns
Were made to lick the dust.

Our subject's work so highly praised, brought him
Two calls to churches; one in Chelsea, Mass.-
A Boston city suburb by the sea;
And Springfield's second church of higher class,
But he refused them both.

He then was sent to preach at Monson, Mass.,
The richest town in all that wealthy state,
Where hats were bleached by thousands in the fields,
And little Ada roamed far down the street,
She said, "To get some frogs".

That Fall fond parents saw their growing boy,
Young Rogers, start to school with stripped pants;
While dad at home had carpenters at work
Upon some alterations in the manse,
And a veranda too.

One Sunday Will announced that he would preach
The next Lord's Day, upon the curious creed
The Unitarians held across the street;
That morning dawned to find them all agreed
To hear what he would say.

On Monday morn~~ing~~ the owner of the mill,
Called Will's chief layman early out of bed,
Demanding that he be dismissed, or he would close
His mill and thus rob thousands of their bread.
A Unitarian.

~~October~~ September came, and with the turning leaves
Arrived the faithful stork all laden down
With Gord., the second boy, a little chap
Who, with his large blue eyes and woolly crown
Was captor of us all.

1916--1917

That year they had to move to Southampton,
A tiny town of residential scope;
A beautiful new church where brother Fred
Appeared one Sunday night amid the group,
To hear his brother preach.

'Twas there that Gordon had the Chicken-pox,
And R. with all his class and many more
Was photographed; and Will was asked to be
July the Fourth's guest orator
By all the veterans.

From there we all could see the famed Mount Tom,
Where by an inclined rail folks reached the tops,
To see the vast expanse of rolling hills,
And other mounts and nearby towns and ~~many~~ crops
Through several telescopes.

In town the favorite sport was soft baseball,
And Will devised a plan so everyone
Could play it in the school when darkness came,
A baseball game so well and nicely done
That it required skill.

In seventeen they moved to Orange, Mass.,
Where Grover had the church all overhauled;
Where Gordon strayed away and soon was lost,
While Rogers sighed and little Ada bawled,
But soon the lad was found.

That Fall the firm that bought the patent rights
Of Rogers'Victor Handcar, wrote to Will,
Inviting him to ~~be the~~ come and head ~~of~~ their ~~great~~ works,
At tripple pay and generous royalties
On his invented toys.

Within another month a smaller firm
Asked him to do the same for them, that they
Would buy his set of curious building blocks
Called "Funny Face", then gave a check to pay,
But he refused both jobs.

1918

That year the U.S. joined the German war;
The pastor of another church entrained,
And Will was given charge of both because
He had a family and of course remained
To carry on the work.

When Rogers got diphtheria at school,
His mother was close quarantined with him;
The other three went to a neighbor's home,
And thus escaped, although their chance was slim,
Because the case was mild.

Meanwhile the war was raging over there,
And Will was asked to be the chairman of
War-speakers board and censor of the shows,
As well as leader of the anti-liquor move,
Along with his two kirks.

It was a time of much illicit trade
In every kind of beer and wine and scotch;
And Will haled several men before the judge,
And put detectives in hotels to watch
The wicked bootleg game.

One night he called police to go with him
To search a building on the edge of town,
And found no less than fifty-three full barrels
Of whiskey in the place, and dumped it down
The nearby county drain.

And now another business offer came,
To take full charge of a new toy concern,
Completed by the richest man in town;
But Will would not accept although he'd earn
Three times his salary.

That year December was a fateful month,
Since scarlet fever visited their home
And put young Rogers once again in bed,
While the two smaller ones were forced to room
Across the busy street.

1919

The old year passed into oblivion,
One child was sick, the other two away,
And then the hand of influenzic death
Snatched from their midst on that eventful day
Their model mother dear.

Within a week Will had to go to bed,
But could not stay because his little son
Required his attention and his skill
As acting cook and nursemaid all in one:
No nurses could be found.

The doctors saw that it would never do,
To let this plan continue for a week,
And finally they got a nurse so Will
Could stay in bed and rest, he was so weak
From many coughing spells.

Meanwhile Aunt Mabel came from Ottawa,
And took the children to her parents'home,
And learned how Ada had crept down the stairs,
And at the bottom slept there all alone
Until the morning dawned.

The funeral was held but father could not go,
Nor could his son, whose fever lingered on;
But as the weary weeks went slowly by
They gained in strength, and 'fore the snow was gone,
Were packed for Ottawa.

While all three children stayed at Ottawa
Their father went to London, where he found
A suite of rooms in his own mother's house,
And then returned and brought them, homeward bound
To start their life anew.

The end of June saw him again in Mass.,
To pack and ship his household goods and books,
And gather their small bank accounts at last,
And bid the folks adieu, whose sorry looks
Made him appear quite sad.

End of Stage I.

S T A G E II.

- 1920 and 1921 -

That year Will bought his mother's city lots and with his brother :,built cottages but soon was asked to become superintendant of a -craft school for returned disabled men and continued there a year gning original toys and playthings. These were made by the men for T.Eaton Co. Toronto. During his evenings he continued clay-model- and produced several interesting pieces including a group of two iators three feet high,a copy of a fine Parian bust of Gladstone a small bust of himself. During his stay in London he was guest cher in most of the city's churches and gave many colored chalk s in their Sunday schools.

He was now urged to join the London Conference and,on account of mother's continued illness,decided to do so. This meant,of course, he should have a wife to go along with him and the children,but ind a suitable compamion was no small task. Nevertheless,with the sters help,he was successful in securing the hand of Miss Mary A. ns,a graduate civic nurse whose unusual talents have made her a efficient and loving mother and wife. They were married on June 921 and at the ensuing Annual Conference were appointed to Wallace Listowel,Ontario. Here they purchased a T Ford car and went right ork and during that year baptized 75 persons and received over 50 the church. This was the first time the children had lived in the try and they will never forget their varied experiences.

In the Fall of 1921 the family drove in to the Western Fair and heir return trip were speeding along in the twilight and singing suddenly they came to a very sharp turn which the driver could make and had to plunge straight into the ditch to keep from rolling . This quick decision,however,threw Mrs Colgrove against the now en windshield and caused a painful scalp wound which delayed us the night but in the morning we were off again for home.

- 1922 and 1923 -

The next summer they were appointed to Brigden which is noted for mud,but the church was quite modern and could boast of a very good r and much good music. In his spare time the minister produced an llent radio set with which he received 140 stations on head-~~sets~~ later he drew a large map of the sky which won him a place in the on Centre of the Royal Astronomical Society of Canada to which he belongs and of which he was president in 1939 and 1940. In the Spring of 1923 Will packed his suitcase and went ondon for another serious operation for hemorrhoids which was very ssful and apparently permanent.

During the second year on this charge he made three church unions hen the Presbytery met his superintendant reported that he had d himself out of a job and there was no place for him. This so ed the meeting that protests came from various ministers and the man was forced to secure him a place.

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- 1924 and 1926 -

One evening while we were listening to the radio a very unusual phenomenon occurred in the form of a slight earth tremor which seemed to act like a roller passing beneath the house. It rattled the dishes but did no damage. Another evening we motored to Courtright where a n excellent four-inch telescope was set up for the public to view Mars which was then in opposition. It was a thrilling sight .

At the following Conference we were sent to Cedar Springs on Lake Erie where we were surrounded by tobacco farms,and before we got settled some members wanted to know when the new minister would preach on tobacco. They had just got rid of Will's predecessor because he was against it,so Will replied that he would not preach on a subject until he had studied it carefully. As time passed several members asked when he intended to preach that sermon but they were assured that it was under preparation and would be preached when it was ready. Some became impatient and began to suggest that the minister was stalling but they found out later when he presented to the board the material for twelve sermons. After twenty months of intensive study and travel along the lake the broadside was ready but the board was so taken back that they asked the minister to preach only one sermon. Will would not agree and said he would compromise and preach only three,to which they consented, but those three had all the thunder of the whole twelve but they were unaware of the storm until it struck,then they wanted to cancel the other two but agreed to let the people decide. This they did by large majority votes. Needless to say that the following Sundays saw all the churches crowded with chattering people from as far as Chatham,and the local paper in Blenheim undertook to print the whole twelve sermons,but as the eighth went to press the publisher called the minister and said he was losing subscribers and wished to drop the series. Will motored over to see him and after much talk,handed him a ten dollar bill,for which the printer agreed to complete the job. How nice of him???

When the series was concluded some mothers desired to have the twelve in booklet form and a small fund was gathered to finance the project but it was hard to find a printer who would undertake the job . Finally it was done to the great satisfaction of scores of families on the lake front and inland and strange to say,the church board did not kick the minister out,but raised his salary instead.

- 1927 to 1929 -

At the next Conference the Colgroves were called to the North St. Charge,away from the tobacco area,but whether this was engineered by those interested in tobacco or not may never be known,but one thing is certain,that charge will not soon forget that minister. At Cedar Spring Will had built his first mechanical planetarium, had bought an excellen three-inch telescope and had traded the Ford car in on a new Chandler edan and was ready for his new charge.

North Street church had just been built and was up to date in every way. Its two attached appointments were also in good condition so that everything seemed ready for a fine start. The congregations grew rapidly so that the leading members talked of an enlargement; at Littlewood a union was made with a small Presbyterian church and their buildings sold, while at White Oak all was harmony. During the year, as was his custom, the minister held evangelistic services. At North St. they were very successful but when he announced that he would extend them to Littlewood church some of the members refused to attend and took their children to a barn dance instead. When asked about it they began a whispering campaign to refuse the minister's salary and force him out of the charge. This divided the charge so that at the next Conference Will chose to go to the Cairngorm Charge where they would live in Strathroy and have high school accomodation.

This charge had been greatly neglected so that much work was necessary to bring it back to normal. Another union was made and all three appointments were treb~~e~~led and each property was repaired and redecorated.

- 1930 to 1933 -

In 1930 the family made a 1600 mile motor trip to Boston and Providence to visit their old charges and in his spare time father built a four-inch refractor telescope and a manual planetarium and lectured on astronomy in many places free of charge. The Chandler car was now traded in for a new Dodge which the children used for a trip to Ottawa. Will now assembled his notes on astronomy for a series of articles on the members of the Solar System for the Journal of the Royal Astronomical Society of Canada. In 1933 father attended the convention of the American Astronomical Society in Ottawa amd that Fall published his book "The Solar System". During this same period we bought our home at 2 Christie Street and moved in.

- 1934 to 1936 -

At Christmas we returned from Cairngorm concert through a heavy downpour of sleet and Will had to keep his head out to see the road, which resulted in a bad attack of sinus trouble for which he had to have an operation. The family now bought a special Dodge car and felt rather big about it. Father was asked to join the University Extension Dept. and lectured in many places at two dollars per night. In the Fall Will set up his own astronomical exhibit at the Western Fair and thereafter was appointed to set up the University exhibits at the fair.

In 1936 he was given charge of Pilgrim United church and did his part toward a union with Dundas Street Centre church but they refused to complete the agreement and in 1937 at 65 he retired and joined the Botanical department at the university where he deposited his collection of over 700 mounted specimens of wild flowers.

Thus the second stage of his activities closed.

STAGE III.

1937 to 1939

This was the year of the worst flood in London's history.
Published "Divine Healing".
Burglars ransacked our house for jewelry and money.
Made Galaxy model and Helical paths of the planets.
Elected president of the London centre of R.A.S.C.
Invented the Sotellunium.
Observed the opposition of Mars.
Observed and obtained the Dresden meteorite.
Built the motorized planetarium.
The King and Queen visited London.
Built the arbor in backyard.

1940 to 1941

Built the Stellar Radiant.
Attended the Astronomical meeting in Toronto.
Took airplane trip home.
Hume Cronyn Memorial Observatory opened and
W.G.C. appointed in charge and public lecturer.
Took trip west with wife to see her brother and the roses.
Botanized Stanley Park and Observatory Hill at Victoria.
Observed the opposition of Mars with telescope at U.W.O.

1942 to 1943

Made large planets and two designers.
Visited Sudbury and botanized Copper Cliff.
Won the Chant Medal of the R.A.S.C.
Made small planets and Planeto-zodiacs.
Photographed the Whipple comet
Wrote many poems (so called)

1944 to 1945

Designed and published the New-Way Star Map.
Also the Student cardboard Solar System.
Published the booklet, "Some Solar System Data".
Built the Leeping Rabbit and the Rocking Doll Carriage.
Attended the O.E.A. at Toronto with instruments.
Published, "Tom, Dick and Harry," on tobacco.

1946 to 1948

Wrote critical survey of ," Some Sects".
Made suggestions for over 400 changes in the Hymnary.
Built six Sotelluniums and several Planeto-zodiacs.
Made large roller star map and more poetry.
Wrote 12 monthly star-map articles for Free Press.
Finished the first two stages of his autobiography.
Invented the Rainbow Piano (The Prismatic Piano)
Instructor in clay modeling class under U.W.O.
Made a bust of Dr. Fox.

- 1949 -- 1950 -

Wrote mid-month astronomical articles for the Free Press.
Continued as Clay-modeling instructor.
Continusd in charge of the Observatory.
Built a 1/40 model of the great 200 inch Hale Telescope.
Planned and published a booklet,"Know Your Stars".
Viewed meteors and lectured about them three hours.
Fainted the next morning at the front door.
Finished some Planeto-zodiacs.
Fainted again on Richmond Street.
Completed the Tellazodiac,a new instrument.
In November of 1950 was asked to send six instruments to the Franklin Science Institute of Philadelphia, U.S.A.
Planned a new three-year course for the London Sculptors' Guild.
Set up a demonstration and display of clay-modeling in Simpsons.
Wrote several new poems and arranged them in book form of 100 pages ready for the printer.

- 1951 -- 1952 -

Published my book of poems entitled,"Spare Time Poems".
Resigned from the Department of Mathematics and Astronomy.
Resigned from the London Sculptors'Guild.
Reclassified the specimens of the U.W.O. botanical herbarium.
This is a composite of seventeen collections,in all 14,000.
Suffered two weeks with flu.and three weeks with penicillin.
Wrote a booklet on,"Modern Answers to Modern Questions" about several biblical problems and published it for Presbytery.
Was called to the office of President Hall to receive a silver tray which is the symbol of retirement from U.W.O.
Moved the Observatory shop to my basement.
Was allowed a bedroom for a den which is now a museum of my work.
On February 26 enjoyed a most delightful surprise arranged by my wife and family. It was my eightieth birthday anniversary and called forth the attached poem, "Eighty Years".

Summary Of Chief Events

Twice he was born -- Physically -- Spiritually.
Four times attacked by disease -- Measles, Grippe, Influ, Sinus.
Six times operated on - 3 Haemorrhoids, 2 Boils, 1 Sinus.
Three times forced to stop school - Entrance, College twice.
Six times escaped death - Pump, drowning, choking, Mt. Royal,
runaway team, shipping case.
Three naked-eye Comets observed - 1882 - 1910 - 1937.
Three large meteors observed - 1890 - 1928 - 1939.
Three times observed Mars in opposition - 1924 - 1939 - 1941.
~~Six~~ Seven times engaged a publisher - Divine Healing, Tobacco Leaves,
The Solar System, Tom, Dick and Harry, S.S. Data, Know Your Stars, Poems,
Three times witnessed hurricanes - Sand storm, willows, barn roof.
Four times visited large observatories - Harvard, Ottawa, Toronto, Victor
Three times burned out - Knowles Co. G.W. Seminary, Ontario Litho.
Twice built gliders - 2 in north London, 1 in Holliston, Mass.
Won several prizes in art - In London, Ont. Rochester, N.Y. Montreal, P.Q.
Three University degrees received - Mc.Gill, Western, Boston.
A variety of college honors were bestowed in each institution.
Five times offered big business positions - Toronto, Montreal, Can.
Winchendon, Athol and Orange Mass.
Three times offered large churches - Asst. St. James, Montreal and
Chelsea and Springfield, Mass.
Three times they welcomed the stork - Rogers, Ada and Gordon.
Twice they went to the Pacific coast - Vancouver, Denver, Victoria.
Four times to the Atlantic coast - Boston, Providence, Martha's
Vinyard and Cape Cod.
Three times climbed mountains - Montreal, Banff and Vancouver (car)
Three times saw great floods - London, Woodstock and Springfield Mass
Twice up in airplanes - London with stunts, Toronto to London.
Twice married - Lucky Guy - Annie and Mary.
In one year during the first war he was pastor of two churches,
Censor of movies, Chair of Drys, and Chair of War Speakers Forum.
Has designed a dozen original toys and playthings.
Has invented and constructed 30 astronomical instruments.
Has published several booklets and many papers on various subjects.
Was superintendent of the school for returned men after first war.
Has served several appointments as pastor in and around London.
Has made four church unions and built churches and parsonages.
Has collected over 700 botanical specimens and gave them to U.W.O.
Reorganized the University herbarium of over 14,000 specimens.
Has been in charge of the Hume Cronyn Memorial Observatory 10 yrs.
Won the Chant Medal of the Royal Astronomical Society in 1942.
Organized the London Sculptor's Guild and Ceramics Club. 1948.
Scores of other semi-important matters ~~may be~~ are recorded in his
Very unusual and interesting poetic autobiography above.

EIGHTY YEARS

1.

When I had lived on borrowed time
A dizzy decade more than most,
Who fade at three score years and ten,
And seldom have a chance to boast
Of what they've thought or said or done
To gain a place within the sun.

2.

My pretty, scheming, better-half,
Unknown to anyone in town,
Planned how she'd fix a glad surprise
For her dear husband, as a crown
For many years of hectic life,
Endeavouring to please his wife.

3.

So when the anniversary
Of my grand, natal day arrived,
I saw the gorgeous plan unfold
As it had been so well contrived;
And then I knew that I would be
The centre of a talking bee.

4.

The first to come that happy morn
To join the fun for father's sake,
Were Pete and Sis and Robin Kay
From fair Toronto by the Lake;
They brought a score of daffodils
To garnish all the window sills.

5.

And placed a large Azalea
Fullblown upon my trembling lap,
And in my hand a well-filled sock
Which made my wondering eyelids flap;
I looked around and grinning said,
"Will someone quickly hold my head".

6.

But ere I could get off my chair
There came a telegram from Gord,
Together with a rose bouquet
To glorify our festive board;
I gasped,"That's from our second son,
And Doris, Barry, Marilyn."

7.

And then 'twas time for lunch you see,
So Mom and I and Sis and Pete
And hungry Robin Colgrove Kay
Looked round for something good to eat;
And then we had an hour's rest
Before we donned our Sunday best.

8.

When suddenly the doorbell rang
To usher in a troubadour,
Who sang the "Happy Birthday" song
Like Harry Lauder, as of yore;
His name is Wallace, famous Scot,
But with no kilties we could spot.

9.

By three o'clock some folks had come,
With gifts of several different kinds,
Of food and fruit and flowers rare,
And books from literary minds;
All afternoon and ~~in~~ night as well
They came to ring our front doorbell.

10.

The second group was ministers
From modest domiciles around,
Each with his wife upon his arm,
No better neighbors could be found
Whose years entitled them to be
True knights of this fine chivalry.

11.

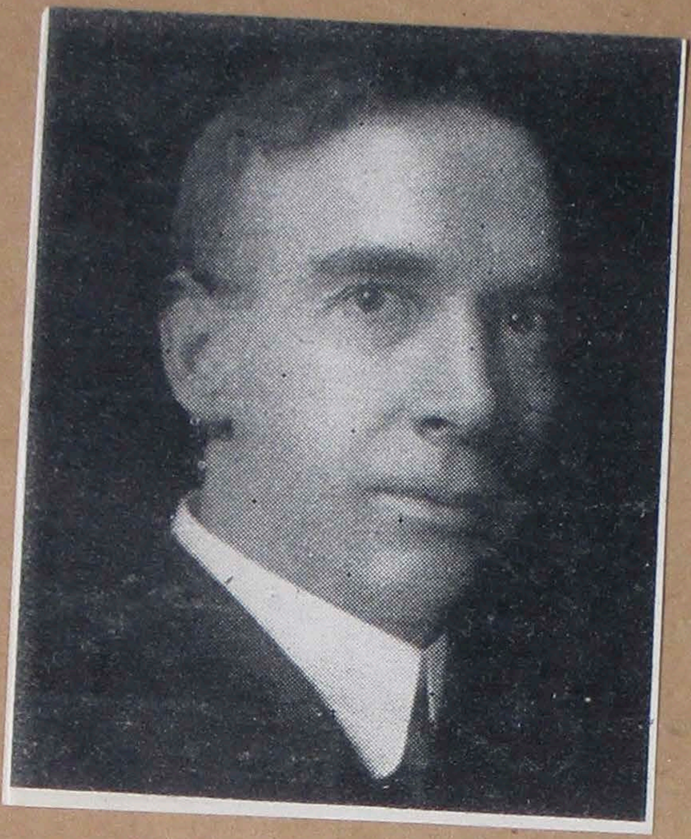
And after them the doctors came
To shake my hand and wish me well,
And comment on my youthful form
And envy me a wife so swell;
They talked and ate and drank some tea
And then departed praising me.

12.

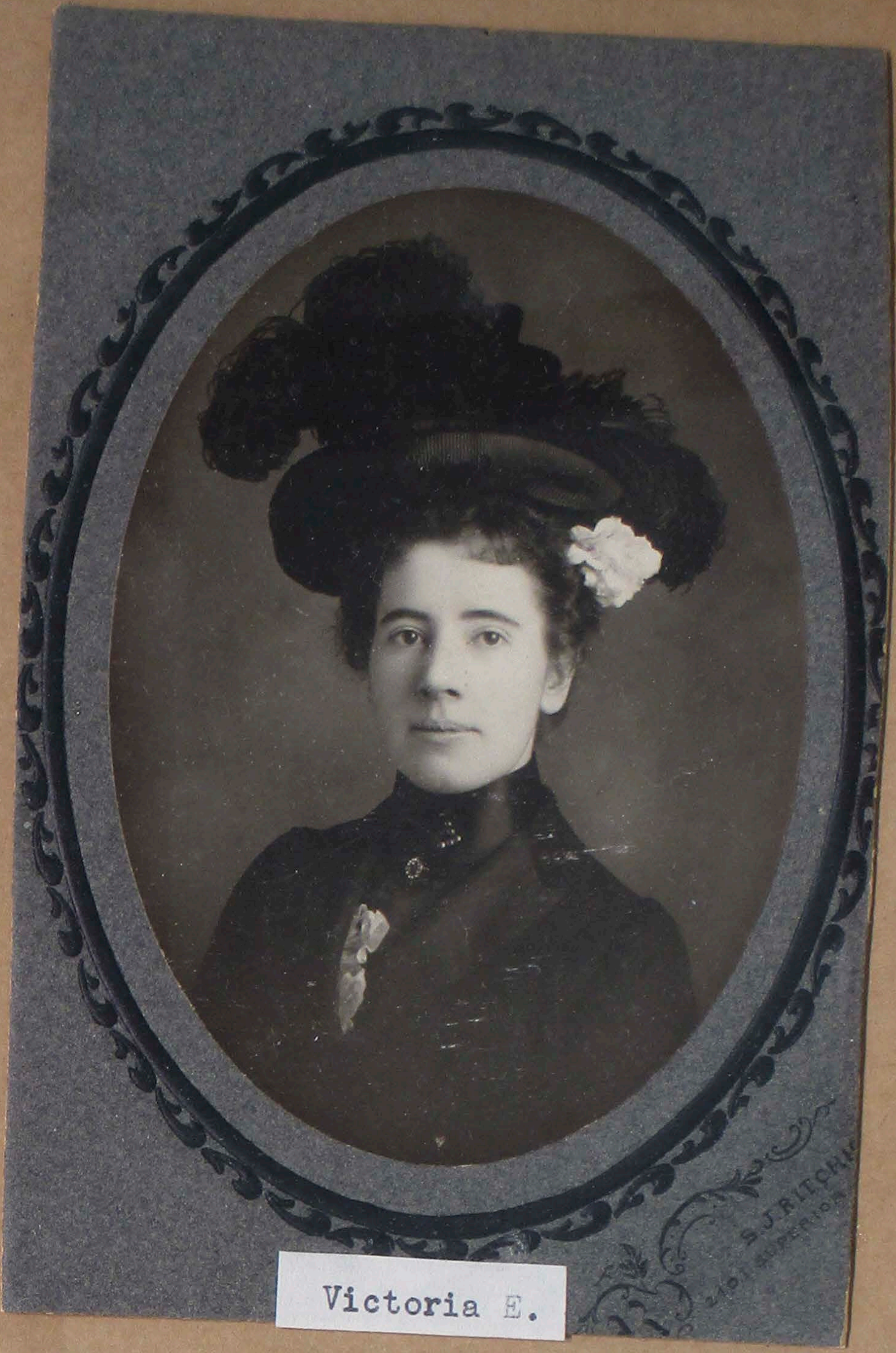
It was a great surprise, 'tis true,
And one that ne'er can be forgot,
Because its happy fellowship
From truly Christian love was wrought;
They made nice speeches, full of cheer
And wished I'd reach my hundredth year.

So thank you chilens for the way
You helped observe my big birthday;
When you are eighty I'll be there
To put you in your old armchair.

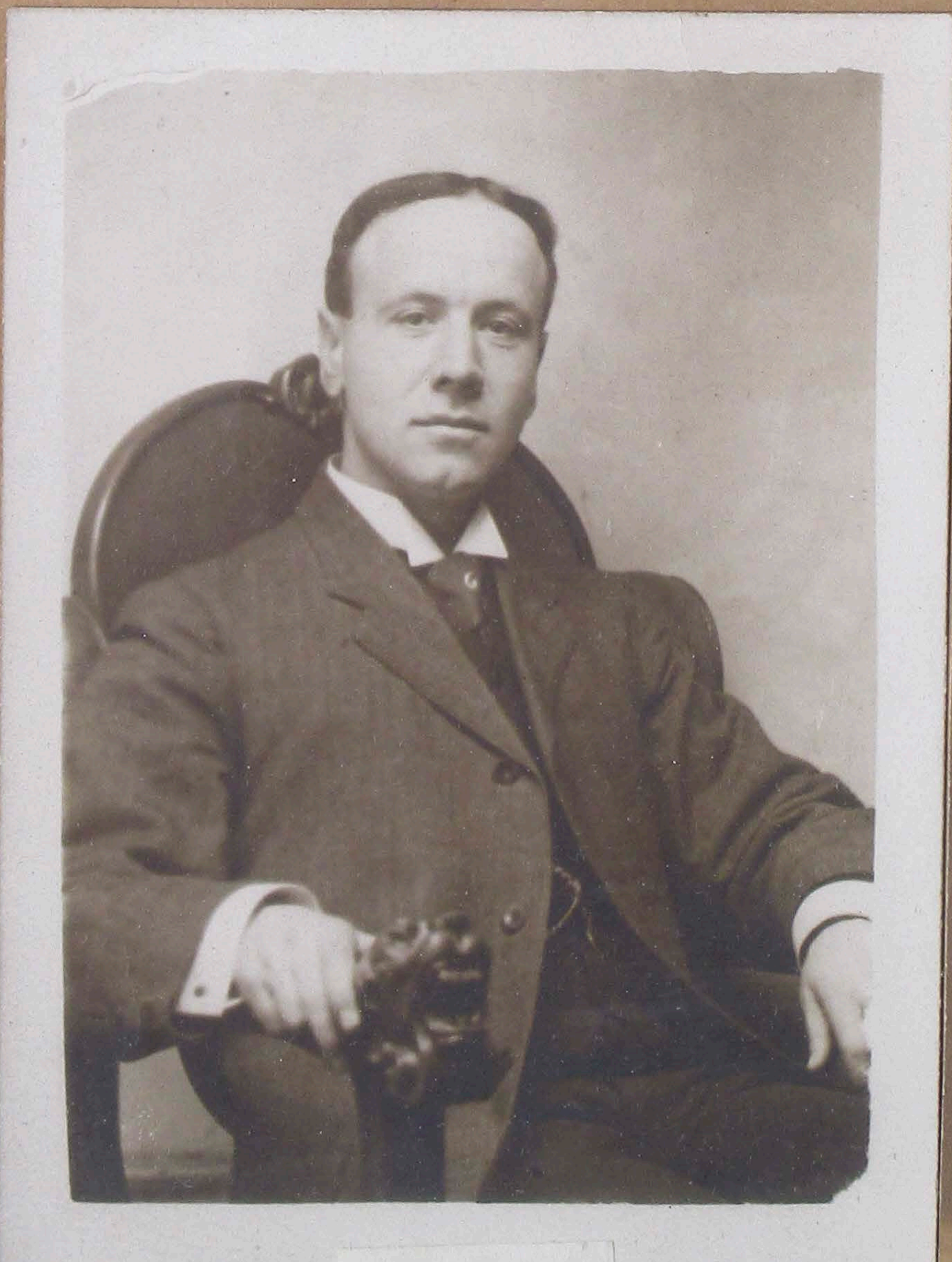
DAD.



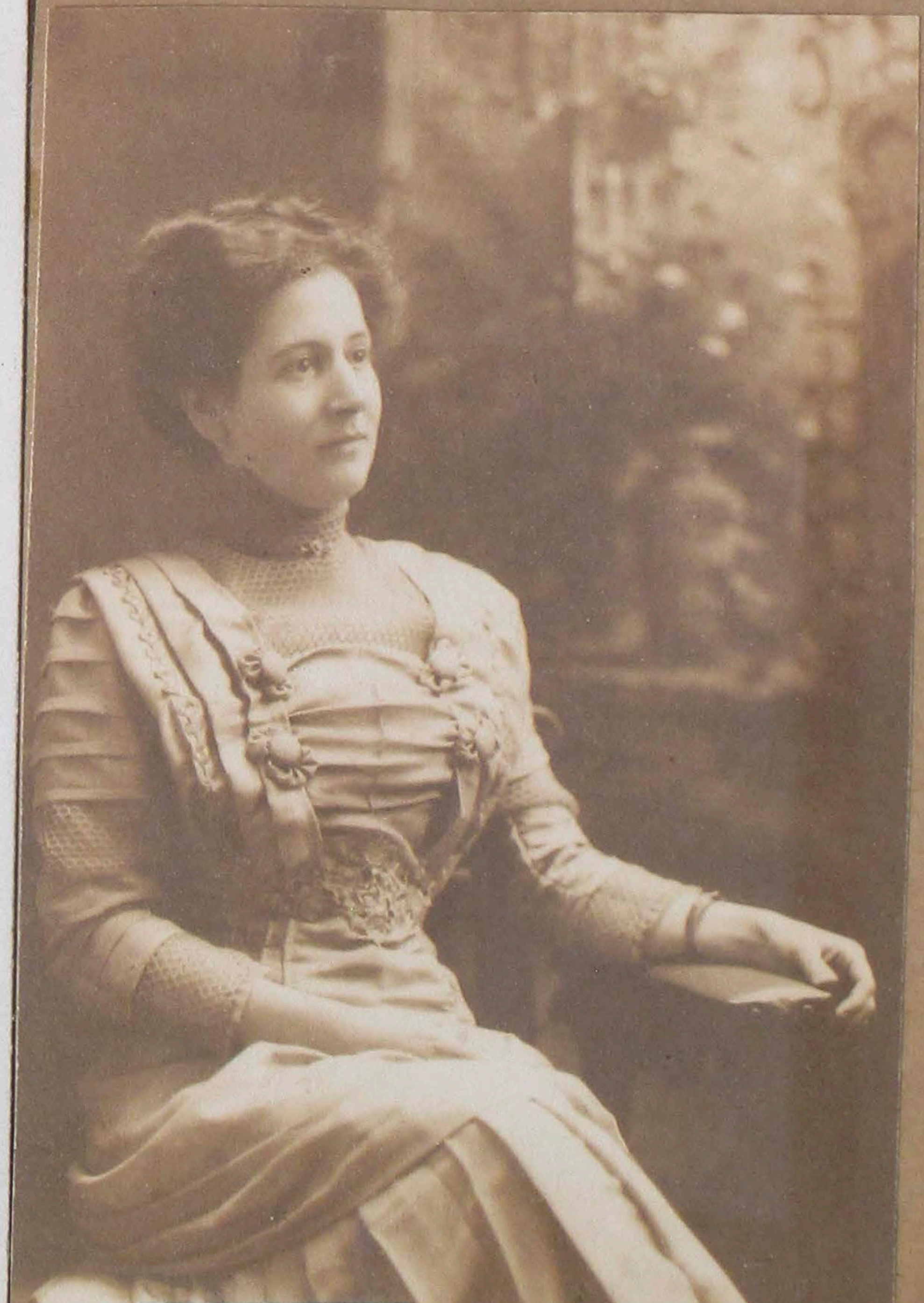
William G.-



Victoria E.



Robert J.

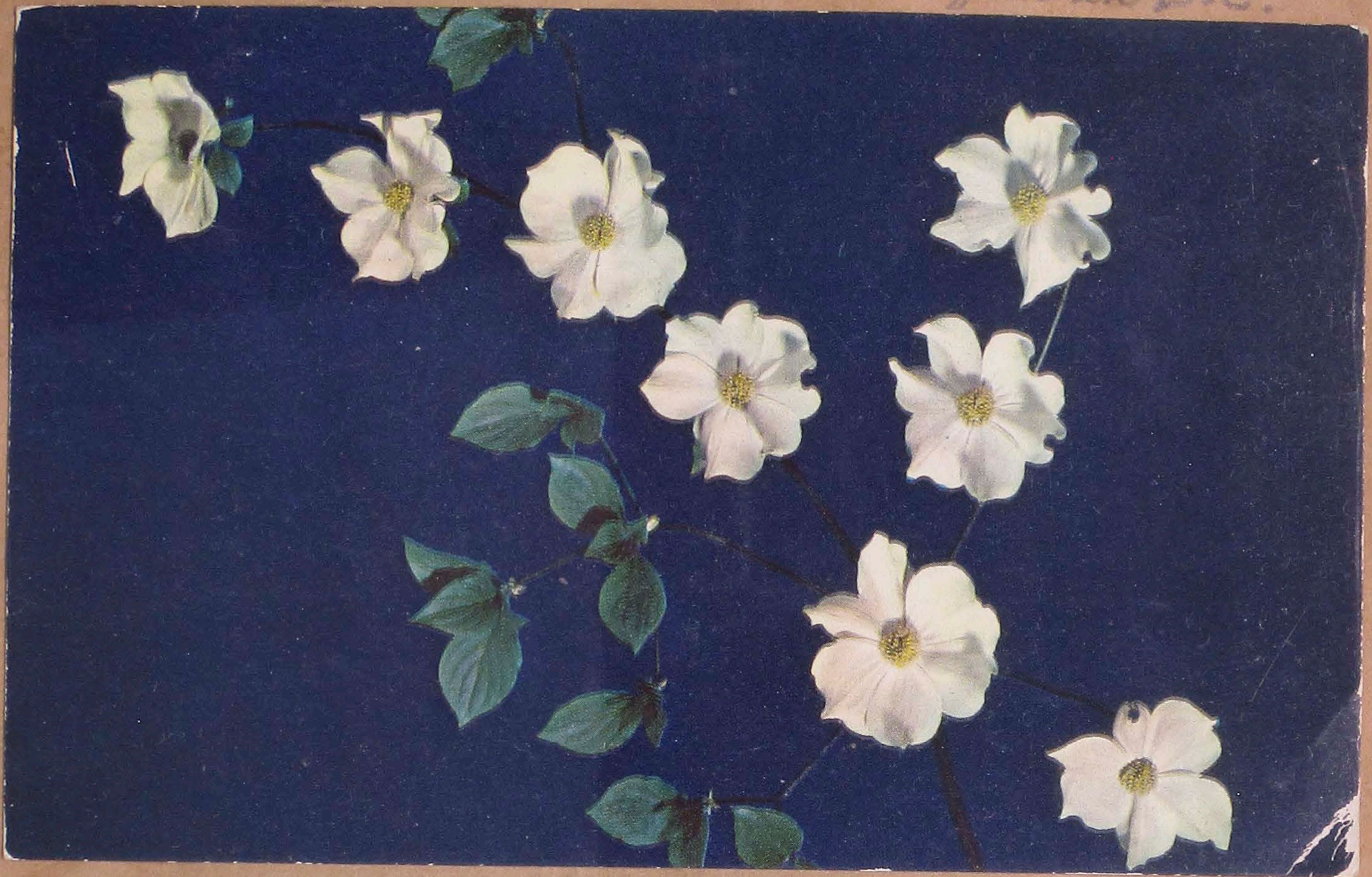


Clara M.

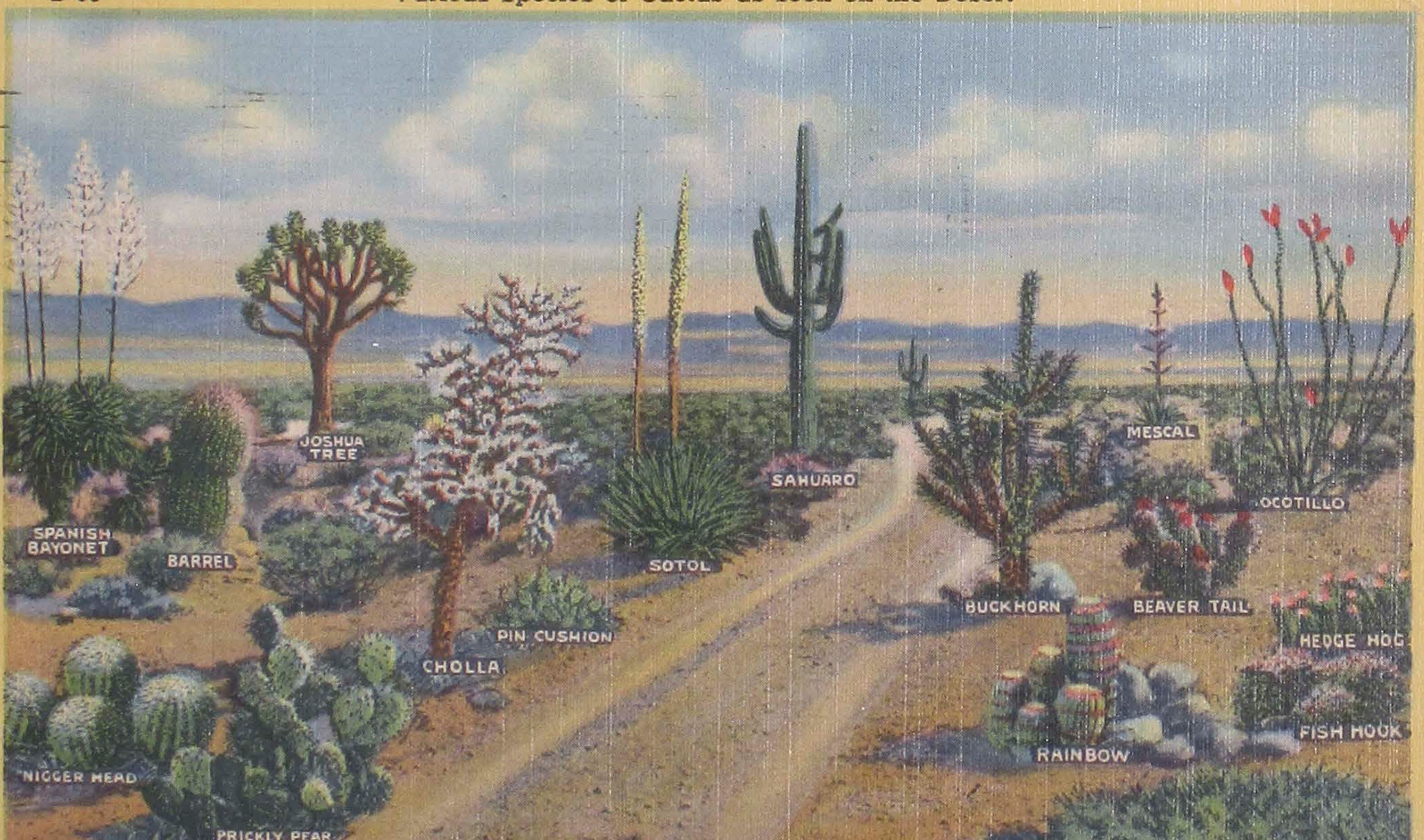
BOTANY

IV

This Dogwood blossoms twice a year in B.C.



D-35 Various Species of Cactus as seen on the Desert



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From Phoenix, Arizona.

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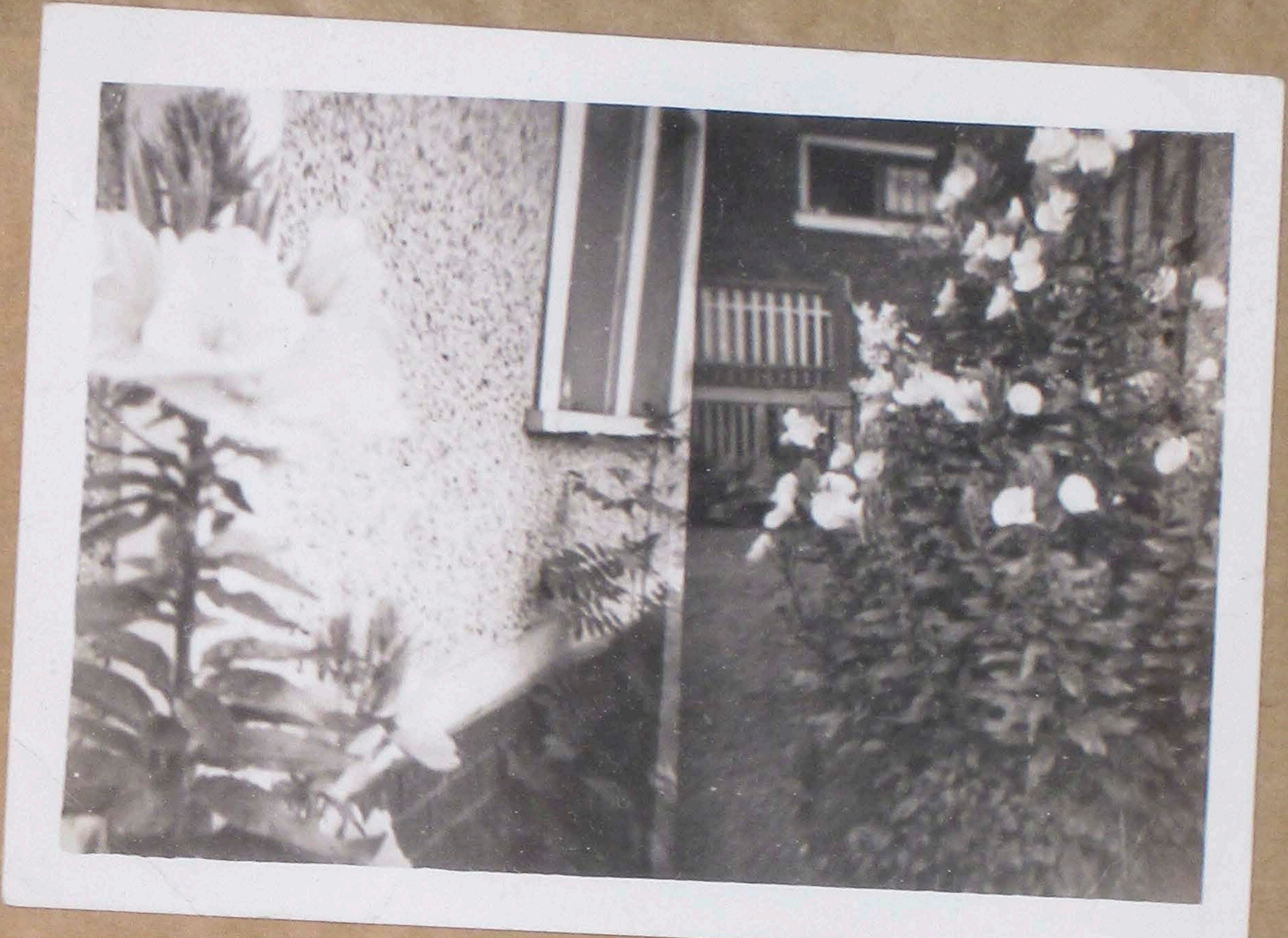


THE NIGHTBLOOMING PRIMROSE
IN MY OWN GARDEN.

This brief list of Botanical specimens is less than half of my own collection, now in the Museum of natural science at the U.W.O. London, Ont. where I spent four years as assistant Taxonomist of 14,000 specimens.

MONOCOTYLEDONEAE

Equisetaceae --- Horsetail

Equisetum - arvense - - - - - - Field Horsetail
Equisetum - fluviatile - - - Pipes Horsetail
Equisetum - hyemale - - - - - Scouring Rush

Pinaceae ------- Pine

Sequoia - - sempervirens - - Lesser Redwood
Thuja - - - occidentalis - - White Cedar
Taxus - - - baccata - - - - - English Yew
Ginko - - - byloba - - - - - Maiden-hair Tree

Alismaceae -------- Water Plantain

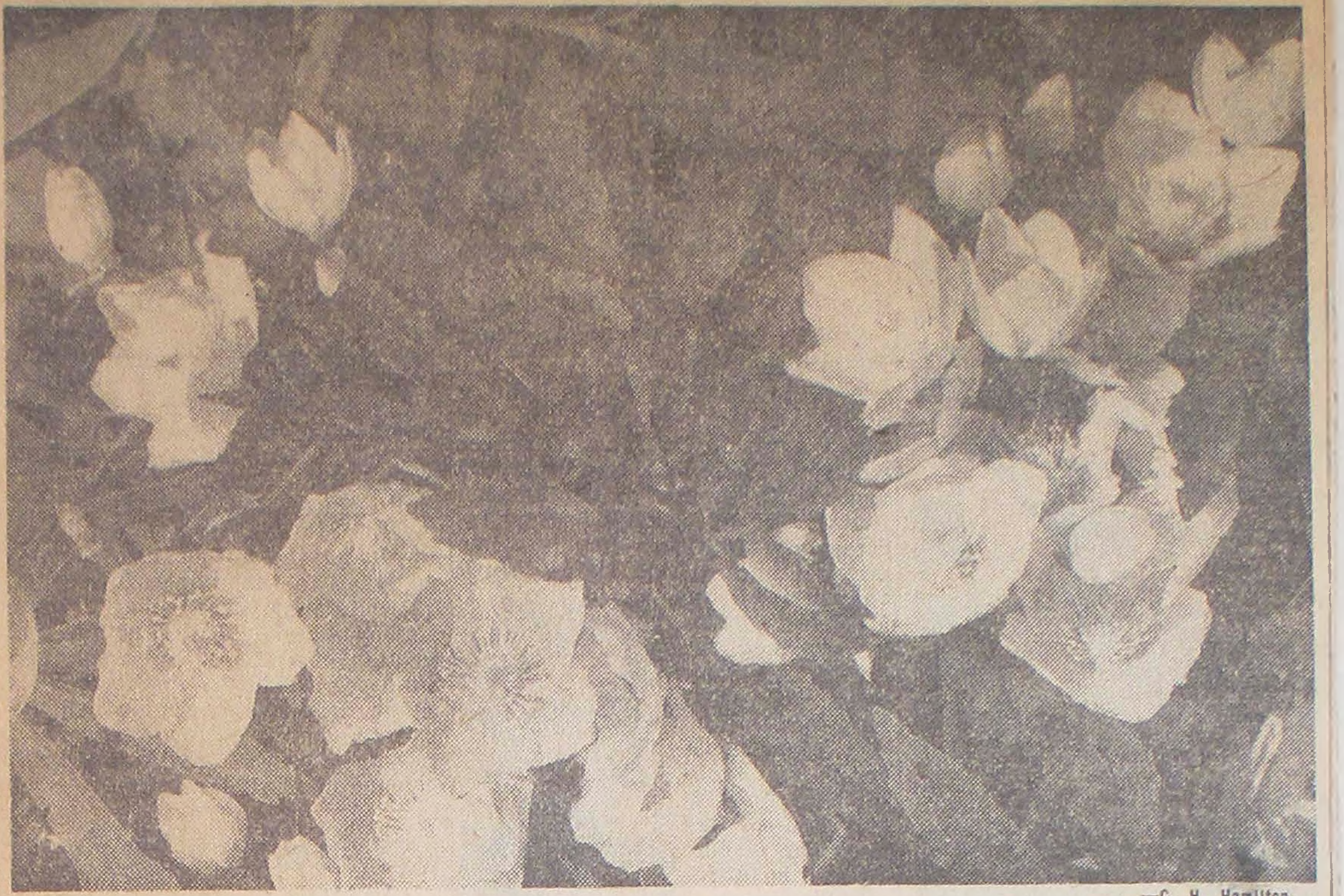
Alisma - - subcordatum - - Water Plantain
Sagittaria- latifolia - - - - Arrow-head
Hypoxis - - hirsuta - - - - - Yellow Star-grass
Acorus - - calamus - - - - - Sweet Flag
Arisaema - dracontium - - - Green Dragon
Arisaema - triphyllum - - - Jack-in-Pulpit

Liliaceae ------ Lily

Allium - - acuminatum - - - Wild Onion
Allium - - tricoccum - - - - Wild Leek
Brodiaea - grandiflora - - - Wild Hyacinth
Brodiaea - lactea - - - - - Fool's Onion
Erythronium albidum - - - - - White Dog-tooth Lily
Erythronium americanum - - - Yellow Adder's Tongue
Hemerocallis - fulva - - - - Tawny Day-lily
Smilacina - racemosa - - - - False Spikenard
Smilax - - -hispida - - - - - Cat Brier
Trillium - erectum - - - - - Purple Trillium
Trillium - grandiflorum - - White Trillium

Orchidaceae -----Orchis

Calopogon - pulchellus - - - Grass Pink
Cypripedium -parviflorum - - Yellow Lady's Slipper
Cypripedium -reginae - - - - Showy Lady's Slipper
Epipactis - pubescens - - - - Rattlesnake Plantain
Habenaria - ciliaris - - - - Yellow-fringed Orchis
Habenaria - hyperborea - - - Leafy Green Orchis
Habenaria - lacera - - - - - Ragged Fringed Orchis
Habenaria - orbiculata - - - Round-leaf Orchis
Habenaria - psycodes - - - - Purple Fringed Orchis
Orchis - - -spectabilis - - - Showy Orchis
Pogonia - - ophioglossoides - Rose Pogonia
Spiranthes - cernua - - - - - Nodding Lady's Tresses



—G. H. Hamilton.

Christmas roses in full bloom in the perennial border, Dec. 11, 1948.

It's a Buttercup

'Rose' Grows Amid Snows Of Canada

G. H. HAMILTON
Botanist, MPC

Four years ago a few rootstocks of the Christmas rose (Helleborus Niger) were planted in the perennial border that edges the lawn behind the writer's home in Niagara Falls. Since that time they have increased and spread until there is a patch of this plant over six feet in diameter that, from November until January, produces a daily crop of dozens of flowers.

To see these delicate white or pinkish-purple blooms, two and one-half to three inches across, poking their heads above the snow that usually prevails at this time of year is always a source of amazement. Visitors observing a bouquet of these flowers on the table usually have to be led to the garden before they will believe that there is a plant that will blossom unprotected outdoors at this season.

The Christmas rose has thick, dark, evergreen leaves which are produced at the end of eight-inch leaf stalks that arise from the surface of the soil. Their shape and size always remind me of the leaves of the peony although, unlike the peony leaf, they are not carried on erect stems. There are underground stems, however, that are black in color which accounts for the "nigger" of the botanical name. The waxy white or purplish-pink flowers provide a contrasting background for the numerous yellow stamens that are borne in the centre of each flower.

The Christmas rose can be grown from seed, but because this is rather a laborious and uncertain process it is customary to propogate them by planting the black rootstocks.

DICOTYLEDONEAE

Asclepiadace ---Milkweed

Asclepias	incarnata	Swamp Milkweed
Asclepias	phytolaccoides	Poke Milkweed
Asclepias	syriaca	Common Milkweed
Asclepias	tuberosa	Butterfly Weed

Balsaminaceae---Touch-me-not

Impatiens	byflora	Spotted Touch Not
Impatiens	roylei	Giant Touch Not

Berberidaceae---Barberry

Caulophyllum	thalictroides	Blue Cohosh
Jeffersonia	diphylla	Twinleaf
Podophyllum	peltatum	May Apple

Betulaceae------Birch

Betula	alba, v.	Paper Birch
Corylus	cornuta	Beaked Hazelnut

Boraginaceae--- Borage

Cynoglossum	officinale	Hound's Tongue
Echium	vulgare	Viper's Bugloss
Lappula	echinata	Common Stickseed
Lappula	virginiana	Beggar's Lice
Lithospermum	croceum	Golden Puccoon
Lithospermum	officinale	Common Gromwell

Campanulaceae---Bluebell

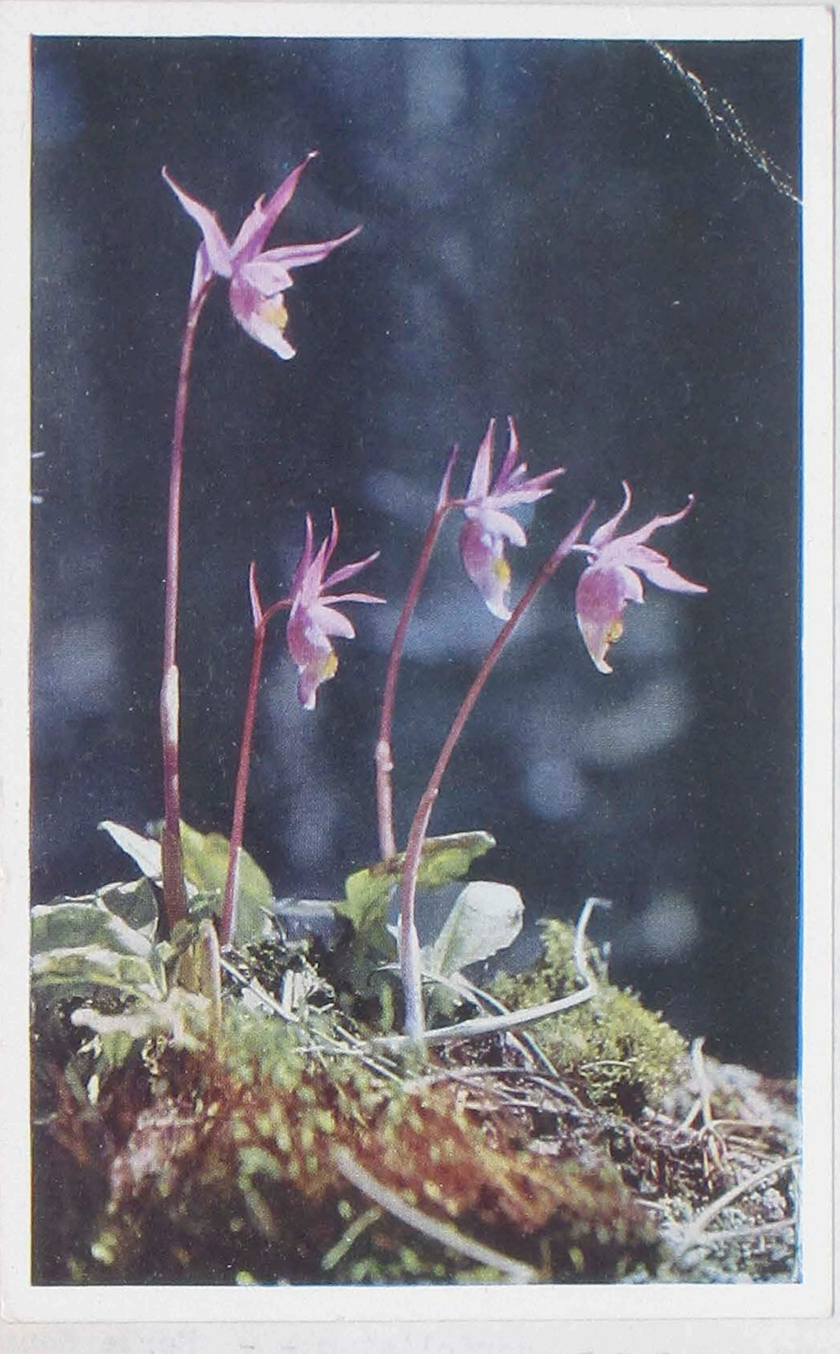
Campanula	americana	Tall Bellflower
Campanula	aparinoides	Marsh Bellflower
Campanula	rapunculoides	European Bellflower
Campanula	rotundifolia	Harebell

Caprifoliaceae--Honeysuckle

Kolkwitzia	amabilis	Beauty Bush
Lonicera	canadensis	Amer.Fly-Honeysuckle
Sambucus	racemosa	Red-berry Elder
Triosteum	perfoliatum	Horse Gentian
Viburnum	cassinoides	Withe-rod
Viburnum	opulus	High-Bush Cranberry
Viburnum	pubescens	Downy Arrow-wood

Caryophyllaceae--Pink

Arenaria	stricta	Diffuse Sandwort
Dianthus	armeria	Deptford Pink
Lychnis	chalcedonica	Scarlet Lychnis
Saponaria	officinalie	Bouncing Bet
Silene	latifolia	Bladder Campion
Stellaria	longifolia	Long-leaf Stitchwort



MORE DICOTYLEDONEAE

Celastraceae-------Staff-tree

Celastrus - - - - scandens - - - - Climbing Bitter-Sweet
Evonymus - - - - europaeus - - - - Spindle Tree
Evonymus - - - - obovatus - - - - Low Strawberry Bush
Evonymus - - - - nanus - - - - - Caucasian Spindle-tree

Chenopodiaceae-----Goosefoot

Atriplex - - - - patula - - - - - Halberd-leaf Orach
Chenopodium - - - album - - - - - Lamb's Quarters
Chenopodium - - - glaucum - - - - Oak-leaf Goosefoot
Salsola - - - - - kali - - - - - Russian Thistle

Compositae------- Daisy

Achillea - - - - lanulosa - - - - Woolly Pink Yarrow
Achillea - - - - millefolium - - White Yarrow
Actinomeris - - - alternifolia - - Yellow Iron-weed
Agroseris - - - - aurantiacum - - Golden Troximon
Ambrosia - - - - artemissiifolia Lesser Ragweed
Ambrosia - - - - trifida - - - - Great Ragweed
Anaphalis - - - - margaritacea- - Pearly Everlasting
Anthemis - - - - cotula - - - - - Stinking May-weed
Anthemis - - - - tinctoria - - - Yellow Chamomile
Arctium - - - - - minus - - - - - Common Burdock
Artemisia - - - - canadensis - - - Canada Wormwood
Artemisia - - - - caudata - - - - Tall Wormwood
Artemisia - - - - frigida - - - - Pasture Wormwood
Artemisia - - - - pontica - - - - Roman Wormwood
Aster - - - - - - cordifolius - - Heart-leaf Aster
Aster - - - - - - divaricatus - - White Wood Aster
Aster - - - - - - ericoides - - - Frosty Aster
Aster - - - - - - laevis - - - - Smooth Aster
Aster - - - - - - macrophyllus - Large-leaf Aster
Aster - - - - - - novae-angliae - New England Aster
Aster - - - - - - puniceus - - - Purple-stem Aster
Aster - - - - - - umbellatus - - - Flat-top Aster
Bidens - - - - - cernua - - - - - Small Bur-Marigold
Bidens - - - - - frondosa - - - - Beggar-ticks
Centaurea - - - - calcitrapa - - - Star Thistle
Centaurea - - - - cyanus - - - - - Corn Flower
Centaurea - - - - nigra - - - - - Black Knapweed
Cichorium - - - - intybus - - - - Common Chicory
Cirsium - - - - arvense - - - - Canada Thistle
Cirsium - - - - muticum - - - - Swamp Thistle
Erigeron - - - - annuus - - - - Daisy Fleabane
Erigeron - - - - canadensis - - - Horse-weed
Erigeron - - - - pulchellus - - - Robin's Plantain
Erigeron - - - - ramosus - - - - Small Fleabane
Eriophyllum - - - lanatum - - - - Woolly Sunflower
Eupatorium - - - perfoliatum - - Common Boneset
Eupatorium - - - purpureum - - - Joe-pye Weed
Eupatorium - - - urticaefolium - White Snake-root
Grindelia - - - - squarrosa - - - Gum Weed
Helenium - - - - autumnale - - - Sneezeweed
Helianthus - - - giganteus - - - Great Sunflower

MORE DICOTYLEDONEAE

More Compositae

Hieracium - - - aurantiacum - - - - Orange Hawkweed
Hieracium - - - canadense - - - - - Canada Hawkweed
Hieracium - - - pratense - - - - - King Devil
Hieracium - - - umbellatum - - - - Umbellate Hawkweed
Lactuca - - - - canadensis - - - - Wild Lettuce
Lactuca - - - - hirsuta - - - - - - Hairy Wild Lettuce
Lactuca - - - - scariola - - - - - Prickly Lettuce
Lapsana - - - - communis - - - - - - Yellow Nipplewort
Leontodon - - - - autumnalis - - - - -Fall Dandelion
Matricaria - - - suaveolens - - - - Pineapple Weed
Onopordum - - - - acanthium - - - - Scotch Thistle
Prenanthes - - - alba - - - - - - Wild White Lettuce
Prenanthes - - - altissima- - - - - Tall White Lettuce
Rudbeckia - - - - laciniata - - - - - Tall Cone Flower
Senecio - - - - - aureus - - - - - - Golden Ragwort
Solidago - - - - canadensis - - - - Canada Golden-rod
Solidago - - - - graminifolia - - - Flat-top Golden-rod
Solidago - - - - rigida - - - - - - Stiff Golden-rod
Solidago - - - - ulmifolia - - - - - Elm-leaf Golden-rod
Sonchus - - - - - asper - - - - - - - Spiny Sow-Thistle
Sonchus - - - - - oleraceus - - - - - Annual Sow-Thistle
Sonchus - - - - - arvensis - - - - - Perennial Sow-Thistle
Taraxacum - - - - officinale - - - - Common Dandelion
Tragopogon - - - porrifolius - - - - Wild Salsify
Vernonia - - - - altissima - - - - - Tall Iron-weed
Zanthium - - - - canadense - - - - - Canada Clotbur

Convolvulaceae---- Convolvulus

Convolvulus - - - arvensis - - - - - Field Bindweed
Convolvulus - - - sepium - - - - - - Hedge Bindweed
Cuscuta - - - - - gronovii - - - - - Common Dodder

Cornaceae-------- Dogwood

Cornus - - - - - canadensis - - - - Bunchberry
Cornus - - - - - florida - - - - - Flowering Dogwood
Cornus - - - - - Nuttalli - - - - - Nuttall's Dogwood
Cornus - - - - - rugosa - - - - - - Round-leaf Dogwood

Crassulaceae------ Orpine

Penthorum - - - - sedoides - - - - - Ditch Stonecrop
Sedum - - - - - - acre - - - - - - Mossy Stonecrop
Sedum - - - - - - purpureum - - - - - Live Forever

Cruciferae--------Mustard

Alliaria - - - - officinalis - - - - Garlic Mustard
Alyssum - - - - alyssoides - - - - Small Alyssum
Arabis - - - - - glabra - - - - - -Tower Mustard
Barbarea - - - - stricta - - - - - - Pale Yellow Rocket
Berteroa - - - - incana - - - - - - Hoary Alyssum
Brassica - - - - arvensis - - - - - Charlock Mustard
Cakile - - - - - edentula - - - - - Amer.Sea-Rocket
Camelina - - - - sativa - - - - - - False Flax

MORE DICOTYLEDONEAE

More Cruciferae

Capsella- - - bursa-pastoris - - - Shepherd's Purse
Cardamine - - bulbosa - - - - - - - Spring Cress
Cardamine - - douglassii - - - - - Purple Cress
Erysimum - - cheiranthoides - - - Worm-seed Mustard
Lepidium - - apetalum - - - - - - Petalless Pepper Grass
Lepidium - - campestre - - - - - Cow cress
Lepidium - - virginicum - - - - - Wild Pepper Grass
Radicula - - nasturtium aqu. - - Water Cress
Sisymbrium - altissimum - - - - - Tumble Mustard
Sisymbrium - canescens - - - - - Tansy Mustard
Sisymbrium - officinale - - - - - Hedge Mustard

Ericaceae------- Heath

Gaultheria - - procumbens - - - - Checkerberry
Gaultheria - - shallon - - - - - - Salal
Ledum - - - - groenlandicum - - - Labrador Tea
Monotropa - - uniflora - - - - - Indian Pipe
Pyrola - - - - elliptica - - - - - Shin-leaf
Vaccinium - - corymbosum - - - - Swamp Blueberry
Vaccinium - - parviflorum - - - - Red Huckleberry
Vaccinium - - pennsylvanicum - - Early Sweet Blueberry

Euphorbiaceae-----Spurge

Acalypha - - - virginica - - - - - Three-seed Mercury
Euphorbia - - corollata - - - - - Flowering Spurge
Euphorbia - - cyparissias - - - - Cypress Spurge
Euphorbia - - maculata - - - - - Milk Purslane
Euphorbia - - marginata - - - - - Snow-on-Mountain
Euphorbia - - peplus - - - - - - Petty Spurge
Euphorbia - - preslii - - - - - - Upright Spotted S.
Euphorbia - - pulgherrima - - - - Poinsettia

Fagaceae--------Beech

Fagus - - - - sylvatica - - - - - European Beech
Fagus - - - - sylvatica Var.- - - Copper Beech
Fagus - - - - grandifolia - - - - American Beech
Quercus - - - alba - - - - - - - White or Stave Oak
Quercus - - - coccinea - - - - - Scarlet Oak
Quercus - - - montana - - - - - - Chestnut Oak

Gentianaceae------Gentian

Gentiana - - - Andrewsii - - - - - Closed Gentian
Gentiana - - - crinita - - - - - - Fringed Gentian
Halenia - - - deflexa - - - - - - Spurred Gentian
Menyanthes - - trifoliata - - - - Three-leaf Buckbean

Geraniaceae------Geranium

Geranium - - - Bicknellii - - - - Bicknell's Geranium
Geranium - - - maculatum - - - - - Crane's Bill
Geranium - - - Molle - - - - - - Dove's Foot
Geranium - - - robertianum - - - - Herb Robert

MORE DICOTYLEDONS

Hypericaceae------- St.John's Wort

Hypericum - - - ascyron - - -Great St,John's Wort
Hypericum - - - Kalmianum - - Kalm's John's Wort
Hypericum - - - Messarium - - Rose of Sharon
Hypericum - - - perforatum - Saint John's Wort
Hypericum - - - prolificum - Shrubby John's Wort

Labiatae---------- Mint

Agastache - - - nepetoides - Giant Hyssop
Collinsonia - - canadensis - Stone Root
Galeopsis - - - tetrahit - - Hemp Nettle
Leonurus - - - cardiaca - - Motherwort
Lycopus - - - - americanus - Cut-leaf Water Horehound
Lycopus - - - - uniflorus - - Bugle Weed
Mentha - - - - gentilis - - Whorled Mint
Mentha - - - - peperita - - Peppermint
Mentha - - - - spicata - - Spearmint
Monarda - - - - didyma - - - Oswego Tea
Monarda - - - - fistulosa - - Wild Bergamot
Nepeta - - - - cataria - - - Common Catnip
Origanum - - - vulgare - - - Wild Marjoram

Leguminosae--------Pulse

Amphicarpa - - bracteata - - Hog Peanut
Apios - - - - - tuberosa - - Wild Bean
Astragalus - - bisulcatus - Two-grooved Vetch
Cassia - - - - marilandica - Wild Senna
Cercis - - - - canadensis - Red-bud,Judas Tree
Colutea - - - - arborescens - Bladder Pod
Desmodium - - - canadensis - Showy Tick-trefoil
Desmodium - - - grandiflorum Sharp-leaf Trefoil
Desmodium - - - nudiflorum - Naked Tick Trefoil
Gymnocladus - - dioica - - - Kentucky Coffee Tree

Lobeliaceae----- Lobelia

Lobelia - - - - cardinalis -- Cardinal Flower
Lobelia - - - - inflata - - - Indian Tobacco
Lobelia - - - - Kalmii - - - Kalm's Lobelia
Lobelia - - - - siphilitica - Great Lobelia
Lobelia - - - - spicata - - - Spiked Lobelia
Buddleia- - - - japonica - - Butterfly Bush

Malvaceae------- Mallow

Hibiscus- - - - syriacus - - Shrubby Althea
Malva - - - - - moschata - - White,Pink Musk-mallow
Malva - - - - - rotundifolia- Round-leaf Mallow

Onagraceae-----Evening Primrose

Circaea - - - - alpina - - - Small Enchanter's Nightshade
Circaea - - - - lutetiana - - Enchanter's Nightshade
Epilobium - - - adenocaulon - North Willow-herb
Epilobium - - - angustifolium Great Willow-herb

MORE DICOTYLEDONS

Polygonaceae-------Buckwheat

Polygonum - - - -aviculare - - - - Creeping Knotweed
Polygonum - - - -convolvulus - - - Black Bindweed
Polygonum - - - -hydropiper - - - Common Smartweed
Polygonum - - - - persicaria - - - Lady's Thumb
Polygonum - - - - scandens - - - - Climbing Buckwheat
Polygonum - - - - sieboldii- - - - Japan Fleece Tree
Polygonum - - - - tenue - - - - - Slender Knotweed

Primulaceae--------Primrose

Lysimachia - - - nummularia - - - Moneywort
Lysimachia - - - terrestris - - - Swamp Candles
Samolus - - - - floribundus- - - Water Pimpernel
Steironema - - - quadriflora- - - 4 flower Loosestrife
Trientalis - - - americana - - - Star Flower

Ranunculaceae-----Crowfoot

Actaea - - - - - alba - - - - - - White Baneberry
Actaea - - - - - rubra - - - - - - Red Baneberry
Anemone - - - - canadensis - - - Canada Anemone
Anemone - - - - cylindrica - - - Thimble-weed
Anemone - - - - multifida - - - - Red Wind Flower
Anemone - - - - virginiana - - - Tall Anemone
Caltha - - - - - palustris - - - - Marsh Marigold
Clematis - - - - virginiana - - - Virgin's Bower
Hepatica - - - - acutiloba - - - - Sharp-leaf Hepatica
Hepatica - - - - triloba - - - - - Dull-leaf Hepatica
Ranunculus - - - acris - - - - - Tall Buttercup
Ranunculus - - - aquatilis - - - - White Water Crowfoot
Ranunculus - - - rhomboideus - - - Dwarf Buttercup
Thalictrum - - - dioicum - - - - - Early Meadow Rue
Thalictrum - - - polyganun - - - - Tall Meadow Rue

Rosaceae------- Rose

Crataegus - - - crus-galli - - - Cock-spur Thorn
Crataegus - - - oxyacantha - - - English Hawthorn
Geum - - - - - - canadense - - - White Avens
Geum - - - - - - strictum - - - - Yellow Avens
Geum - - - - - - triflorum - - - - Plumed Avens
Potentilla - - - anserina - - - - Silver Weed
Potentilla - - - canadensis - - - Five Finger
Potentilla - - - fruticosa - - - - Shrubby Cinquefoil
Prunus - - - - - japonica - - - - Japanese Quince
Prunus - - - - - lannesiana- - - - Jap.Flowering Cherry
Rosa - - - - - - acicularis- - - - Prickly Rose
Rosa - - - - - - rubiginosa- - - - Sweet-Brier Rose
Rubus - - - - - idaeus - - - - - Wild Red Raspberry
Rubus - - - - - spectabilis - - -Salmon-berry
Spiraea - - - - alba - - - - - - Meadow Sweet
Spiraea - - - - discolor- - - - - Ocean Spray
Spiraea - - - - tomentosa - - - - Hardhack

THE THINGS THAT GROW IN MY GARDEN

AROUND THE HOUSE

Colorado Blue Spruce	Picea pungens
Silver White Maple	Acer saccharinum
California Privet	Ligustrom ovalifolium
Lily of the Valley	Convallaria majalis
Pyramidal Cedar	Thuja pyramidalis
Barren Trumpet Vine	Bignonia ~~sterilis~~
Mixed poppies and	California,Shirley
French Marigolds	Double and Single
Blue Flag	Iris versicolor
Tawny Day-Lily ~~N-of-house~~	Hemerocaullis fulva
Lily of the Valley " "	Convallaria majalis
VARIEGATED " "	
Pyramidal Cedar	Thuja pyramidalis
Red Japanese Barberry	Berberis Thunbergii
New Red Salvia	Salvia
Double Mock-Orange	Philadelphus virginale
Japanese Barberry	Berberis Thunbergii
Wild Senna	Cassia marilandica
Portulaca grand-flower ~~S-of-house~~	Portulaca grandiflora

BELOW BACK VERANDAH

Common Phlox	
Maiden-hair Fern	Adiantum pedatum
Sensitive Fern	Onoclea sensibilis
Jack in the Pulpit	Arisaema triphyllum
Canada Honewort	Cryptotaenia Canadensis
Hairy Sweet Cicely	Osmorhiza Claytoni
Wild Onion	Allium cernuum
White Trillium	Trillium grandiflorum
Yellow Lady's Slipper	Cypripedium parviflorum
Red Trillium	Trillium erectum
Blood-root	Sanguinaria Canadensis
Herb Robert	Geranium Robertianum
Dutchman's Breeches	Dicentra cucullaria
Squirrel Corn	Dicentra Canadensis
Tall Buttercup	Ranunculus acris
Round-leaf Hepatica	Hepatica triloba
Regal Lily	Lilium regale
Double English Violet	Viola Angliae
Queen Lady's Slipper	Cypripedium reginae
Wild Lettuce	Lactuca
Common Phlox	

N.E. PLOT

Black Currant	Ribes nigrum
Maltese Cross	Lychnis chalcedonica
Columbine	Aquilegia vulgaris
Night-blooming Primrose	Oenothera gigantea
Yellow Coreop~~o~~sis	Coreopsis lanciolata
Four Delphiniums	
Common Rhubarb	Rheum rhaponticum
Golden Bells	Forsythia veridissima
Rock Cress	Arabis alpina
English Gooseberry	Ribes hirtellium
Garden Loosestrife	Lysimachia ciliata
Six Lupines	Lupinus perennis

The 8-foot Strip is filled with Cardinal Flowers, Sweet Williams and many kinds of poppies as well as Hollyhocks.

THINGS IN THE GARDEN 2

Along South Fence and East end

Japanese Quince	Cydonia Japonica
Star of Bethlehem	Ornithogalum umbellatum
American Bellflower	Campanula rapunculoides
Delphinium	
Moth Mullein	Verbascum blattaria
Giant Touch-me-Not	Impatiens roylai
Yellow Coreopsis	Coreopsis lanceolata
Bright-eyed Phlox	Phlox maculata
Madonna Lily	Lilium candidum
Kentucky Coffee-tree	Gymnocladus dioica
Christmas Rose	Helleborus niger
Pink Oriental Poppy	Papaver orientale
Black-eyed Susan	Rudbeckia serotina
Forget-me-Not	Myosotus scorpioides
White Hydrangea	Arborescens grandiflora
Regal Lily	Lilium regale
Salmon Phlox	Elizabeth Campbell
Sweet Rocket	Hesperus matronalis
Red Bergamot	Monarda didyma
Pink Lupine	Lupinus perennis
Cosmos,pink and white	Cosmos bipinnatus
Tiger Lily	Lilium tigrinum
Double White Lilac	Syringa vulgaris
Pompon Poppies	
Orange Oriental Poppy	Papaver orientale
Bouncing Bet	Saponaria officinalis
White Phlox	Phlox
Weigelia	Rubra - Eva Rathke
Harmless Thistle	Cirsium integrifolium
Grape Hyacinth	Muscari bothyoides
Japanese Quince	Cydonia Japonica
White Valerian	Valeriana edulis
White Spruce	Picea Canadensis
Peony,rosa	Peonia officinalis
Single Mock-Orange	Philadelphus conquete
Schizanthus	Wisetonensis
Everlasting Pea	Lathyrus latifolius
Pink Rose	VanFleet
Red Phlox	
Salmon Phlox	Elizabeth Campbell
Red Rose	Paul's Scarlet
Schizanthus	Wisetonensis
Single Mock-Orange	Philadelphus conquete
Peony,rosa	Peonia officinalis
Grape Hyacinth	Muscari bothyoides
Waterleaf	Hydrophyllum virginianum

THINGS IN THE GARDEN 3

AROUND THE GARAGE

English Ivy	Hedera helix

Double Orange Lily	Hemerocallis aurantiaca
Red Rose	Paul's Scarlet
Pink Rose	Dr. Van Fleet
Rosy Pyrethrum	Pyrethrum roseum
Brown-eyed Susan	Rudbeckia speciosa
Polyanthus Rose	Rosa magnifique
Shasta Daisy	Chrysanthemum leucanthemum
Pink Rose	Dr. Van Fleet
Bouncing Bet	Saponaria officinalis
Gas Plant	Dictamnus fraxinella
Madonna Lily	Lilium candidum
Mullien Pink	Coronaria atrosanguinea
Pink Rose --------over window--------	Dr. Van Fleet
Giant Touch-me-Not	Impatiens roylai
MossPink	Phlox subulata

W E E D S

Common Chickweed	Stellaria media
Mouse-ear Chickweed	Cerastium vulgatum

Common Plantain	Plantago major
Rib-grass	Plantago lanceolata
Summer Dandelion	Taraxicum officinale
Lady's Sorrel	Oxalis corniculata
Daisy Fleabane	Erigeron ramosus
Horse-weed	Erigeron canadensis
Ground Ivy	Nepeta hederacea
White Clover	Trifolium repens
Common Purslane	Portulacca oleracea
Milk Purslane	Euphorbia maculata
Lamb's Quarters	Chenopodium album
Round-leaf Mallow	Malva rotundifolia
Common Pigweed	Amaranthus retroflexus
Common Ragweed	Ambrosia artemisiifolia
Canada Thistle	Cirsium arvense
Shepherd's Purse	Capsella bursa-pastoris
Goosegrass	Polygonum aviculare
Bindweed	Convolvulus arvensis
Quack Grass	Agropyron repens
Red-top Grass	Agrostis alba
Finger Grass	Digitaria sanguinalis
Lady's Thumb	Polygonum persecaria
Annual Sow-thistle	Sonchus oleraceus

W.G.C.

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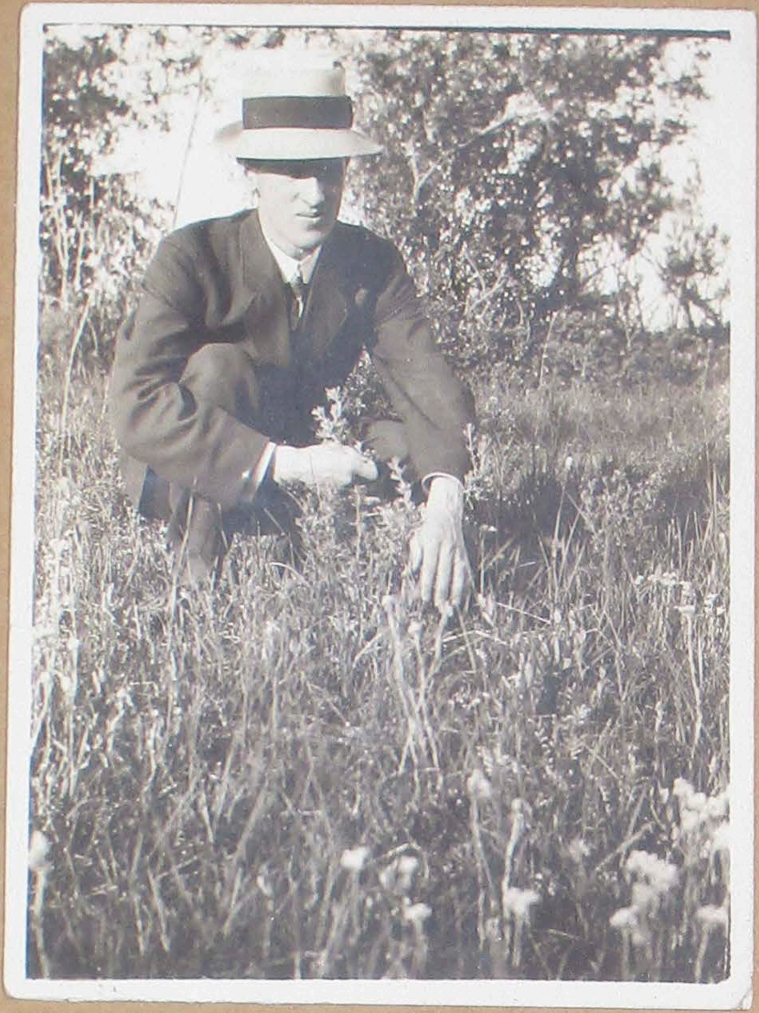

Mark G.

Native W.O. Plants Displayed

A collection of plants native to the fields of Western Ontario is now on display in the print room of the art gallery of the library. The collection, made by the Rev. W. G. Colgrove, of the University of Western Ontario, contains more than 200 varieties. Admiring the exhibit are, Asta Pirnimae, left, and Barbara Whittaker, of the library circulation department staff.

Library Displa
District Pl

Some 200 specimens of
western Ontario's plants —
portion of the 14,000 sp
from all parts of the worl
are contained in the Univ
Western Ontario's herbar
are now on display in th
Library's print room.

The exhibit, arranged by
W. G. Colgrove, local tax
will be continued for about

Specimens on display w
lected for the most part in
sex County. Mr. Colgrove
these plants between 1934

Cards identifying the sp
disclose such colorful na
Nodding Ladies' Tresses, S
the-Mountain. Pearly Eve
Garden Touch-Me-Not, M
Skullcap, Devil's Pai
Swamp Candles, Hairy Ga
Naked-Flower Tick Trefo
cules Club. Petty Spurge,
Mouth and Dutchman's Br

For the benefit of visito
scientific and common na
plants are shown, with info
on the locality where they a
family to which they bel
date they were obtained.

Night Blooming Primroses Grace Minister's Garden

In fact and in fable "roses are red, and violets are blue," but night-blooming primroses—25,000 blooms of them—in the spic and span flower garden of Rev. W. G. Colgrove, 2 Christie street, are a question mark to local botanists.

The green-foliaged biennials, the flowers of which open during late evening and do not close their brilliant yellow petals until mid-morning, are confounding botanists here because of this very peculiarity.

To date, maintains Rev. Colgrove, a retired minister and enthusiastic astronomer as well as a successful gardener, no scientific reason has been advanced as to why these native United States flowers should prefer night blooming over day blooming.

Grow Anywhere

"They will grow anywhere," he pointed out, and drew attention to the fact that the 15-foot row of thickly-flowered foliage was planted in the poorest soil in his garden.

Rev. Mr. Colgrove related how the seeds were given to him by a visiting missionary three years ago, and since that time hundreds of botanical students, their professors, and other flower lovers have come to see this wonder of nature.

The first year, they grow to a height of only a foot, and bear no flowers. The second year, they tower to between six and seven feet, and are topped with myriads of pure yellow flowers, each between three and four inches across. This year it is estimated the plot will bear 25,000 blooms.

"Last evening I picked more than 500 blooms," said Rev. Mr. Colgrove. "They last longer if they are picked every evening during their flowering period. The first blooms appear around July 1, and the plants bear for the next 50 days. The flowers open up "between 8.30 and 9.30—just at dusk."

"The steeples (pointed green arms encompassing the petals, and holding them wrapped) snap open, and the flower opens before your very eyes," is the way he described this phenomena of nature. "At the instant the petals begin to loosen, the flower gives off a sweet odor, otherwise they give off no perfume," he said.

From dusk they remain open in their full glory, and by midnight seem to be "aglow." About 11.30 the next morning "they go back to sleep."

While Rev. Mr. Colgrove is mighty proud of his night-blooming primroses, he is not one tiny bit selfish with them. Since the original seeds came into his possession, he has distributed thousands of them to friends, neighbors and residents of several other cities. The success of these people in reproducing the primroses has been reflected in countless letters of thanks received by the London minister.

Aug. 1946

FLASHLIGHT SHOTS OF FLOWERS are the exception rather than the rule, but at Rev. W. G. Colgrove's flower garden, 2 Christie street, it became a necessity to photo his night blooming primroses, because the brilliant yellow blooms, "open before your very eyes," at dusk and close again by early morning. Rev. Mr. Colgrove is shown with an 11-quart basket of blooms he has picked, watching a flower burst open.

THE WITCH BROOM

Some years ago I wandered wide,
In search across the countryside,
For specimens of interest to
The teacher of our little zoo,
Who taught us many useful facts
Of nature's secret ways and acts.

One day as I was driving o'er
A hillock, near the western shore
Of ancient lake, I saw a nest
High in a tree, and did my best
To climb and take the novel prize,
No matter what its shape or size.

But soon I saw 'twas far too great
For me alone to amputate,
And then it clearly proved to be
No nest, but some strange malady,
Developed by a parasite
That now was hidden out of sight.

A stunted growth so flat and wide
It spread four feet from side to side,
And two feet thick, with underneath
A mat of branchlets in a wreath,
All clustered like a great bouquet
For someone's sylvan wedding day.

It seems that by unlucky blow
An interloper, Mistletoe,
Had lodged a spore upon a limb,
And struck its roots with eager vim
Deep down within the pine tree's bark,
And drank its life-blood in the dark.

Thus it cut off the constant flow
Of sustenance from down below,
So that the branch soon drooped and died,
And fell to earth all brown and dried:
While the usurper grew apace
And more than filled the other's place.

'Twas soon removed and taken to
The museum at Western U.,
Where now the students may behold
A Witch Broom, oft in story told;
And anyone who cares may see
The strangler of the Scotch Pine tree.

1948

This huge "witches' broom", consisting of hundreds of stunted pine twigs and caused by a parasitic growth which interrupted the normal development of a young pine tree on University of Western Ontario grounds, was removed yesterday to save the tree. In Western Ontario, the condition is rare. A. R. Walker, professor of plant pathology, is shown examining the growth.

"Cancer" in a tree, like cancer in humans, demands an immediate surgical operation.

Armed with saws and ladders, a University of Western Ontario botany department group yesterday performed an emergency "operation" on a young pine tree on the university grounds.

Working high above ground they removed a huge "witches' broom," which is a rare ailment in trees in Western Ontario, and parallels cancer in humans.

* * *

The "broom" or "besom" was a record size, four feet long by three feet wide and nearly two feet deep. It consisted of a mass of tangled, stunted pine branches which had grown at an uncontrollable rate, each smothering the other. Thousands of small boughs intertwined until the main stem of the branch had no space to grow.

It was discovered by Rev. W. G. Colgrove, who said he noticed it a year ago when "I thought it was a squirrel's nest," he said.

"Recently my attention was drawn to it again on account of its great size and it did not take long to see it was a parasitic growth."

Witches' brooms are caused by a parasitic growth, such as mistletoe, which disturbs the natural growth of the tree. In this case, no mistletoe was visible, but the effect of the parasite had caused the tree to develop a great green "bouquet" of evergreen branches packed close together.

The name "witches' broom" came from England, where mistletoe is common. Often, the growths resemble the old-fashioned brooms of twigs, and were in fact gathered by cottagers to use for that purpose.

In Canada the condition is rare, and the university is asking for reports on similar conditions seen elsewhere.

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THE OLDEST STORY

CHRIST AND THE STARS

V

A SUMMARY of DR. SEISS' BOOK

PART I. ~~THE~~ CHRIST IN THE CONSTELLATIONS

Consult Star Maps in Chap X

e progressive self-revelation of God is threefold:--
.The most recent- the Christ, in person about 2,000 years ago.
.The intermediate- the Bible, by inspiration about 4,000 yrs.ago.
.The most ancient- the Stars, " " " 6,000 yrs.ago.
a. The creation of the universe and the divine purpose.-Glory.
b. The grouping of the stars and the invention of the signs.12,36
c. The sidereal figures and their consecutive arrangement.
Later additions and changes of names to suit myths.
The results of historical and archeological research.

et us examine these pictures painted with a brush of comet's hair.

--- A Unique Revelation---

IRGO - A fallen woman yet holding in her right hand a star Alazal which means the Branch and in her left the star Subilon,now called Spica,meaning the Seed,of the woman.

Coma just above means the Desired One instead of Berenice's Hair.

Bootes to the left means the coming Shepherd with a rod & sickle. Its brightest star Arcturus means keeper of the flock and the star in his right hand Katurops means Rod or Branch.

Centaurus below means the destroyer of ~~[illegible] beasts. diseases~~ destroyers. Jesus the wise,good,just and powerful healer who nevertheless as the Heb.indicates,was despised by men and finally killed.

IBRA - The balances to weigh the price of sin which is death. Scales have always been the symbol of justice. The first star Zuben Genubi means the price deficient- man. The second star Zuben Shemali means the price sufficient- Christ. The third star Algubi means heaped up high.

Crux below stands for the Cross and signifies sacrifice and its ancient name means cutting off, but temporary.

Lupus also below - ~~better Sura means [illegible]~~ Wolf which was slain by the Centaur shows that Jesus the destroyer of disease and death allowed himself to suffer death, and that by his own will.

Corona above is the Crown of eternal immortality given as a reward for Jesus'willing sacrifice on the cross.

SCORPIO - The terrible scorpion in conflict with Ophiuchus the giant restrainer of evil who stands with one foot on the monster's back and the other on its tail by which he is fatally stung. The chief star Antares means wounding and tearing and refers to the effect of the sting which was the most painful injury known and in turn refers to the agony of the Christ.

Serpens is nearby endeavouring to seize the Crown but cannot since Ophiuchus holds it in his powerful grip.

Ophiuchus means deliverer and represents Jesus as our deliverer.

Hercules higher up is the giant god-man of the Romans but his real name in Egyptian means the Coming One and the star in his head Rasal Gethi means the head of the bruiser while the star in his right arm means the kneeling Branch. His foot is on the head of Draco the dragon.

SAGITTARIUS - The double natured archer is like the rider on the white horse. His arrow is pointed at the heart of the Scorpion for he must destroy the works of the devil.

Lyra is above and has always represented joy especially of victory. Its brightest star Vega means he shall be exalted in triumph.

Draco higher up is the Dragon,a bold,defiant,destructive beast lying half round the pole and representing the evil so widespread in the world which Hercules will destroy. Draco means the trodden on and its chief star has two names, Al Dib the reptile and Al Waid the one to be destroyed. Other stars are similar.

In this first series we have. ~~the Nature~~ seen the Birth, Life, Suffering and Victory ofJesus.

Ara

PART TWO

THE CHURCH IN THE CONSTELLATIONS, OUTLINE

In this second series of constellations we see the inception, strug- and eternal destiny of the Church which is the company of believers.

ricornus - A dying goat conjoined with the living tail of a fish which represents the dying Christ as the sin offering for and the source of the living Church, since fish always have been the symbol of the saved. The names of its chief stars Dabih and Algedi mean the one cut off and the slain sacrifice. This unusual combination indicates the mystical union that exists between Christ and the Church.

Sagitta lies north and means arrow, flying to its mark, Capricornus. It is the arrow of justice against sin which slays the One who took the sinner's place, but by his death the believers have eternal life.

Aquila means Eagle wounded and falling to its death. Its bright star Altair means the wounded one and the name of the star beside it means the bleeding one, a third star means the one wounded in the heel. The eagle is one of the Biblical symbols of the Christ and is the natural enemy of the serpent.

Delphinus, close to the others, is a strong fish, the Dolphin the symbol of resurrection, leaping from the sea and representing the return of Christ from the grave as well as the resurrection of those who are his.

arius - A man with a large vessel pouring water from heaven to earth, symbol of the river of the water of life, in a never ending supply and signifying the outpouring of the divine spirit on the Church. Its chief star Sadal Melik means the record of the outpouring.

Pisis Aus. to the south is another fish which is drinking in the entire stream poured fourth by Aquarius and symbolizes the unlimited supply of refreshing for the believers.

Pegasus to the north is the flying horse of the fountain bearing good tidings. Messengers rode horses then. Pega means chief and sus means the coming horse while the other star names, Markab means returning, Scheat means going, Enif means branch, Algenib means one who carries, Homan means the waters, all of which point to the command to carry the message to all.

Cygnus is farther north and is the great swan, lord of the waters. Its name means circling and returning and its chief stars Deneb means the judge to come, Fafage means glorious and shining, Sadir means returns in a circle, Adige means flying swiftly, with the message to come and drink.

sces - The two fishes joined by a band, again the symbol of the Church, in the old and the new dispensations. Its chief stars Okda and Al Samaca mean united and upheld.

The Band in uniting both periods represents their connection and mutual dependence. The unusual looping of the band round the foot of the Ram or Lamb shows how Christ is the point of the unity between the two dispensations and that He upholds, guides and governs both by the same means.

Cepheus farther north is a great king holding aloft a branch and wearing a crown of stars. He is seated on a throne with one foot on the pole star and represents Christ in his exalted reign. The names of the stars are significant, Alderamin means quickly returning and Alphirk means redeemer which the Egyptians called the ruler that shall come.

2. of Part II.

Andromeda ~~is~~ just above was a beautiful woman chained to rocks out of spite and represents the Curch in the world of sin and by it hindered, opposed and even bound so that she cannot do the work for which she was intended. Her name means ruler of man and expresses the authority of the Church over the lives and conduct of its members. The Church must innocently suffer because of the world's ill-favor. The chief star names mean afflicted, weak, broken and chained just as history tells us.

es ----- This is a Ram or Lamb and its name means chief or head and the principal star AlHamal means the sheep while the two others, El Natik and Al Sharetan mean the bruised and the slain. Another star nearby means uplifted, so we see the Christ once slain now exalted, and holding the band of the two dispensations of the Church.

Cassiopeia lies far to the north and is a stately queen lifted from the sin-cursed earth & her age-long enemies to a place beside her king and husband in the sky. Her name means the one delivered from all evil while the star named Shedar means the one freed, Ruchbah means enthroned, and Datal Cursa means the seated one.

Cetus directly below is the leviathan of Job~~s~~ and Isaiah, the great natural water enemy of the fishes and the beast satan who ~~would have~~ seeks to destroy~~ed~~ Andromeda, the Church. Its chief stars Menkar and Diphda mean chained enemy and overthrown in harmony with the prophecy that the Christ will some day bind and destroy him.

Perseus above the ecliptic is the Breaker spoken of in Micah. The figure of a mighty warrior with uplifted sword in his right hand and the bleeding head of the Gorgon in his left. He is coming to free Andromeda and destroy the beast. The star at his left foot is Atik and means breaker, Algenib means the one who carries away, Mirfak means one who helps, Medusa means the one trodden down, AlGhoul (Algol) means the evil spirit satan.

We have now seen the Church begun, developed, hindered, despoiled d finally raised to its divine and eternal destiny.

PART THREE

THE JUDGMENT IN THE CONSTELLATIONS, OUTLINE

In this third series of constellations we see the assignment of rnal awards and the consummation, glory and felicity of the Christ the Church he has saved.

RUS -- Called the Bull but it is the terrible two-horned Reem of Job and Isaiah, a fierce untamable giant ox of great strength and speed. This is again the Christ now coming to judgment, a Lamb in his Church but a destroyer of evil. Its chief star Aldebaran means the coming Captain or Leader, coming from the Lamb and together standing over the head of Cetus. The Pleiades are seven maidens representing the Church who are with Him in the work of judgment. "Taking vengence on them that know not God".

Orion to the left is another picture of the powerful agents of judgment, a mighty hunter who according to Jeremiah shall hunt all hiding sinners and bring them to the bar of justice. His name Orion means he who cometh forth as light, while the chief star Betelguese means the coming Branch, Rigel means the foot that crushes, Bellatrix means swiftly coming and destroying.

Eridanus just below means the river of the judge found in Daniel and Isaiah, a river of fire engulfing all that is evil and sweeping east and west on its way to the lake of fire. But in the midst of the destruction there is opportunity for any who truly desire safety and so the next group

Auriga farther north is not a chariot driver as the Greeks imagined but a shepherd carrying two kids in his arms and its chief star Capella means little kid. The shepherd is holding them safe from the great destruction.

MINI-- The so-called twins, also called Adam and Eve. The idea is of two persons united in a sexless marriage and once again we have Christ and his Church, the marriage of the Lamb. Pollux means the judge, Wasat means seated, the Egyptians called him Horus the coming slayer of the serpent. Castor means the coming judge.

Lepus beneath Orion is not a hare but a serpent, its ancient name Basti-Beki means the offender confounded and its three most important stars, Nibal, Rakis and Sugia mean the mad, the caught and the deceiver.

Canis Major to the left is the great dog destroyer of snakes and its brilliant star Sirius means victorious prince, Mirzam means ruler, Muliphen means chief, Wezen means illustrious, Adhara means glorious and Al Habor means mighty. The Egyptians called Seir ~~and~~ Naz Seir from which comes Nazareth.

Canis Minor the smaller dog and companion of Sirius. Procyon means Redeemer and Al Gomeiza means redeemed.

ANCER -- The great crab, again the Church with its many members. The crab discards its shell periodically as the believer casts away the old man of sin and is renewed. In the centre is a wonderful group of stars called Praesepe which means the multitude of the innumerable seed, Kahn means the resting place and cer means encircled. The Church at last gathered to its safe resting place. Its chief star Acubens means the good shelter, Ma'Alaph means assembled thousands, and Al Himarein means lambs. ~~Standing over Hydra.~~

sa Major well to the north is at present called the great bear but look at its tail. Its chief star name Dubhe was thought to be from dob which in Greek means bear but it really means fold, Merach means flock, Asad means the assembled multitude, El Acola means sheepfold, Alioth means the ewe and El Kaphrah means the redeemed.

rsa Minor near the pole is a smaller sheepfold with Al Ruccabah the pole star meaning keeper of the fold, Kochab means those waiting for the comming one, AlPhirk means the young, Al Gedi the kid and Al Kaid the assembled.

Argo to the south is the ship of Zion which has reached the heavenly port. Its chief star Canopus means the possession of him who cometh, Sephina means a multitude of goods, Tureis means the possession secured and Soheil means that which was desired.

--- The Lion of the Tribe of Judah. It was Judah's sign and its ancient names all mean the one that tears, rends and destroys. The king of wild beasts, quick, agile, powerful and terrible to meet. Here is Christ again but in the role of a lion. He is no more the weak lamb but the great King, Lord and eternal Judge. Regulus, like Rigel in Orion, means the feet that crush, Denebola means the judge who cometh, Al Giebah means the exalted and Zogma means the brilliant.

dra is beneath and is another form of serpent whose name means the abhorred, Al Phard means separated and excluded, Minchir al Sugia means the punishing or tearing to pieces of the deceiver.

rater is the cup of the wrath of God poured out on the serpent.

Corvus is the raven or bird of prey also on the serpent. AlChiba means the curse inflicted, while Minchir al Gorab means the raven tearing to pieces. The bird of doom.

Divine judgment has finally fallen on the wicked world.

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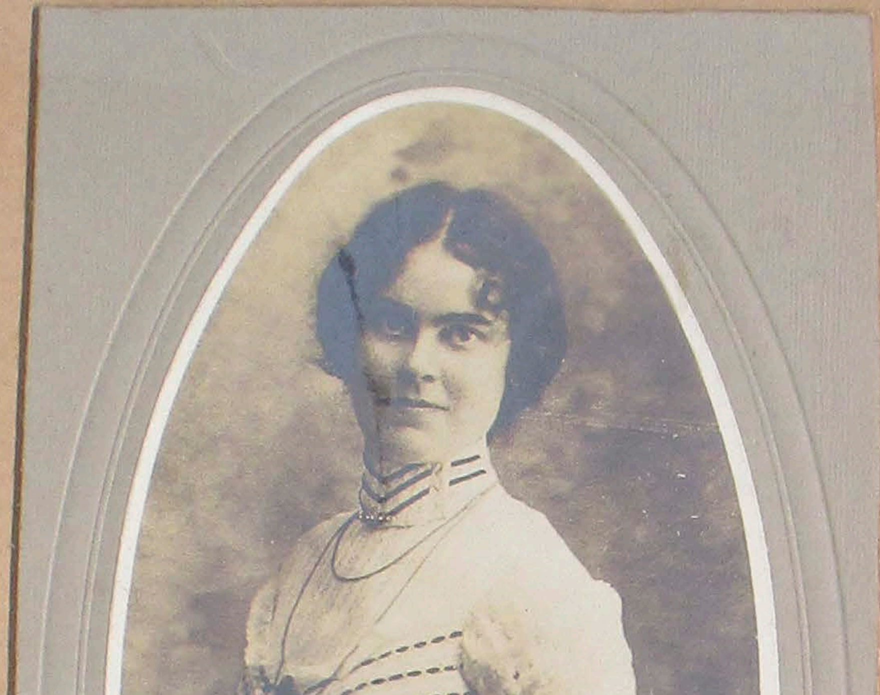
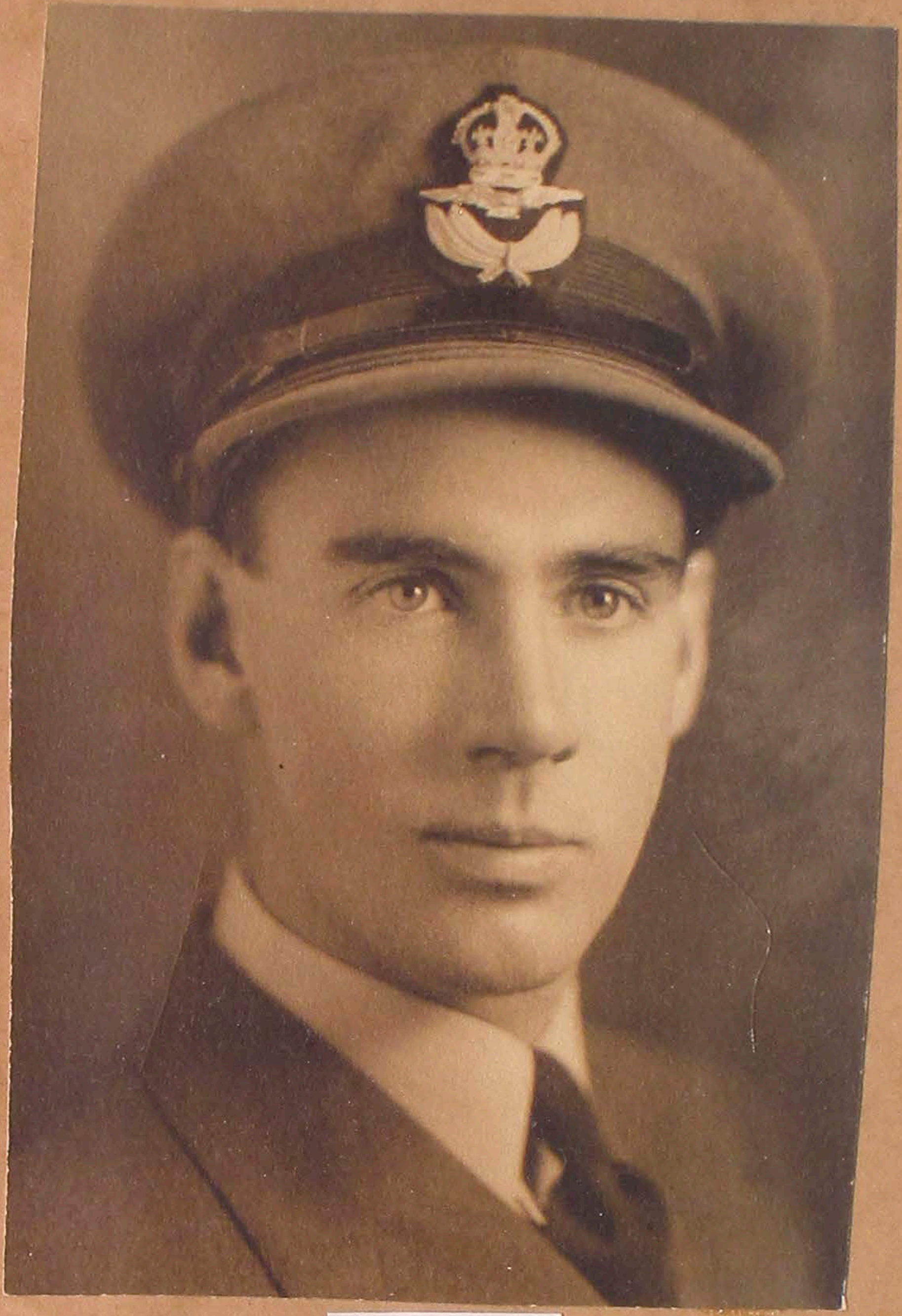


Annie L. Colgrove, Mother of Three.



Rogers G.

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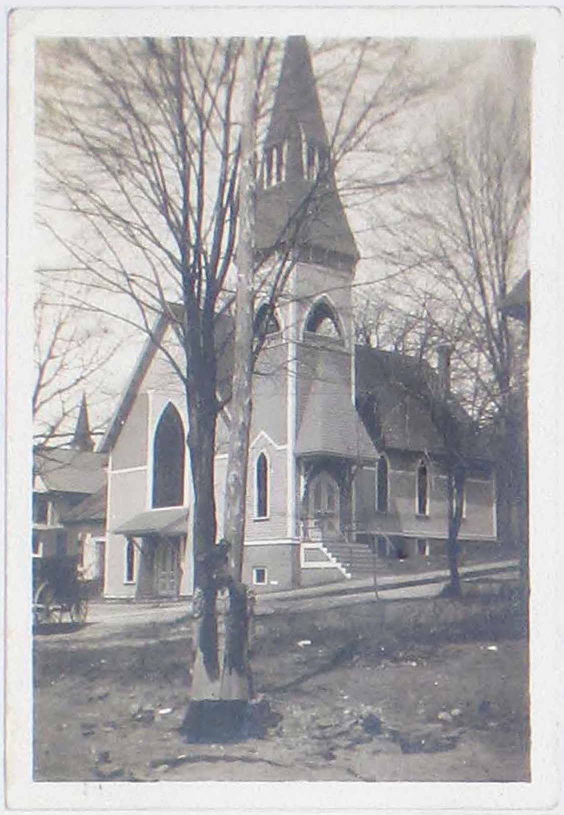
MY CHURCHES IN U.S.

VI



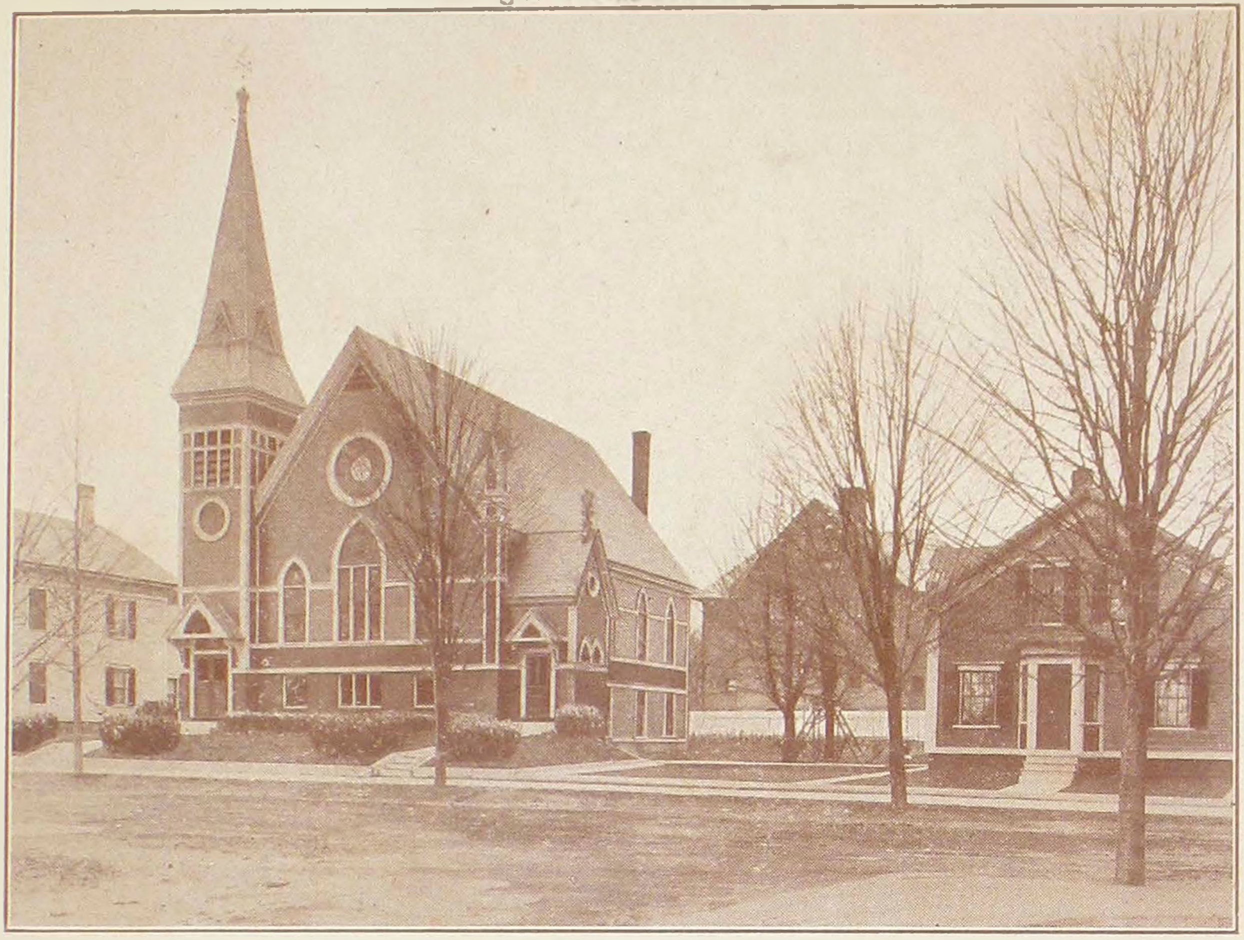
The Methodist Church at Ayer Mass.
My student charge while at
Boston University.

Coral Street Methodist Episcopal Church

1872-1913

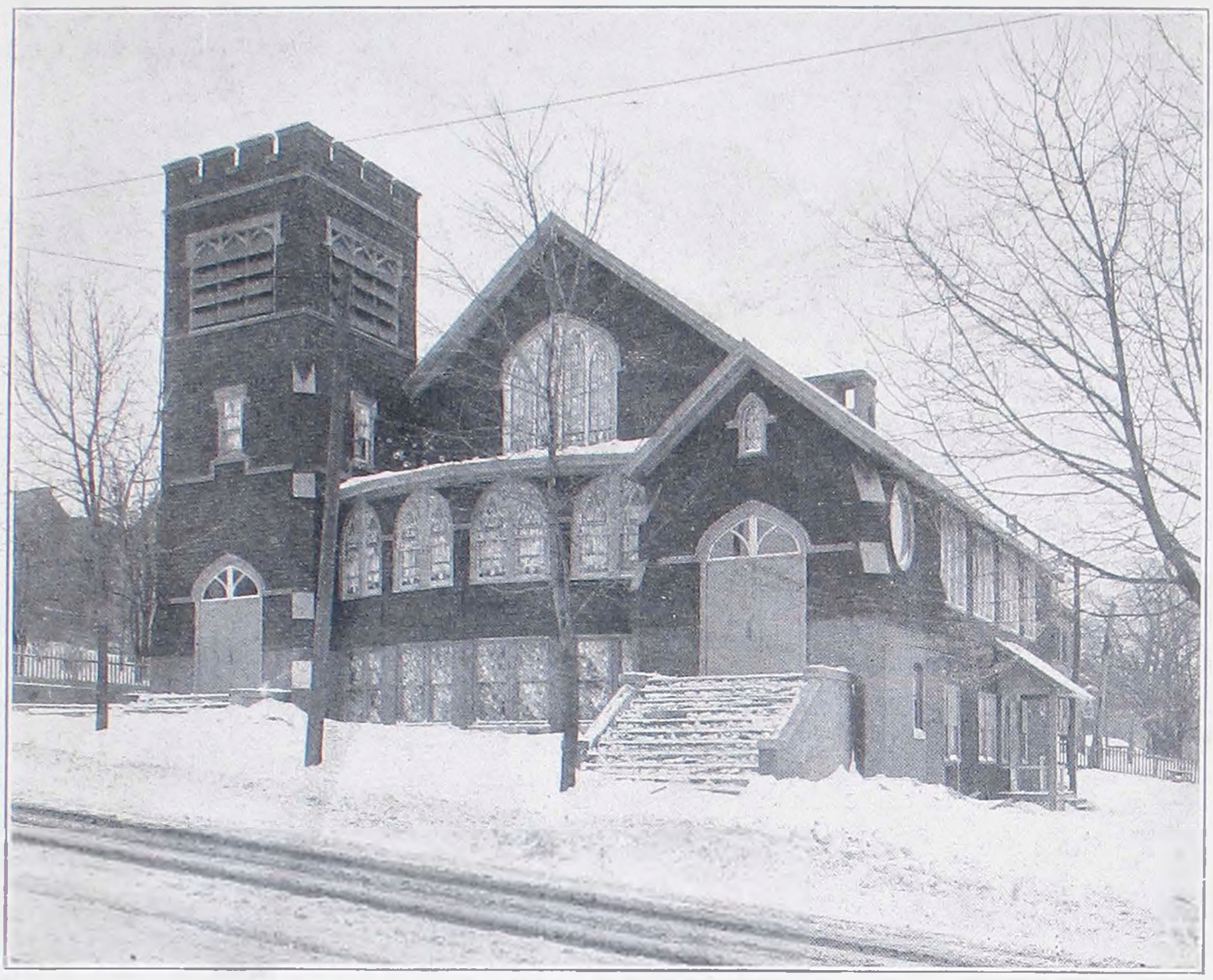
The Coral Street Methodist Church in Worcester Mass.a city of over 200,000 where I preached after graduation.

First Methodist Episcopal Church
Orange, Massachusetts.



BUILT 1890 REMODELED 1918

The Methodist Church in Orange Mass.
Which I served along with the
Congregational Church during
the first world War.



ovenant Methodist Episcopal Church, Worcester, Mass.

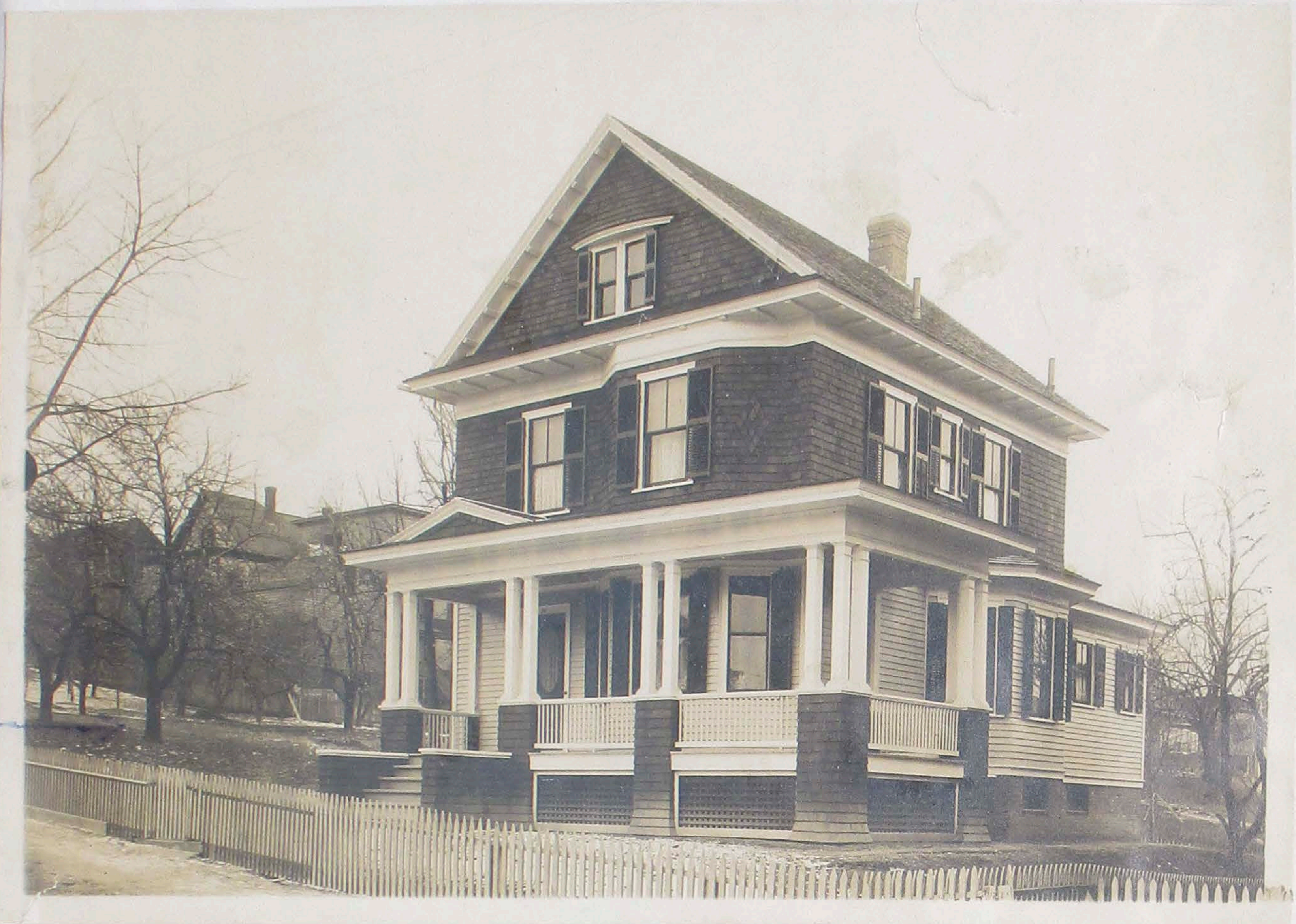
The Covenant Methodist Church in Worcester Mass.
Which I planned along with a new parsonage on next page
which we occupied the day ADA was born.

St. James United Church

463 St. Catherine St. West

Montreal, Que.

Where He was invited to be assistant.



OUR Parsonage in WORCESTER, MASS.

McGill University,

Montreal, March 16th. 1908

I hereby Certify that

WILLIAM GLADSTONE COLGROVE

took the course in Moral Philosophy in the Third Year in the Faculty of Arts.

His standing is as follows :

78% - First Class - Prize

CLAY MODELING

VII

THE FREE PRESS, LONDON, ONTARIO, SATURDAY, MAY 29, 1948

"CLAY GUILD" IN SESSION

NEWEST AMONG GROUPS dedicated to the cultural and creative arts, the London Sculptors' Guild boasts an increasing membership under the tutelage and direction of Rev. W. G. Colgrove. In this picture, clay-modeling classes are in full swing in the carpentry classroom at the H. B. Beal Technical School. "Guild" members at the work bench in the right foreground are, from left to right, Mrs. G. Mitchell, Rev. Mr. Colgrove, Mrs. A. M. Fraser, Miss Edyth Stewart and Mrs. G. Rasmussen. At the bench in middle-distance, left, are Mrs. Laing, Mrs. Doig, Mrs. Carter and Mrs. H. J. Weekes, while behind this group are A. C. Woolley, George Essex, W. O. Moore and Mrs. Mary Jones. The two boys at the right rear are Arthur Roberts and Keith Manness. The quartet between them and the bench at right front includes Mrs. Willis, Miss McCallum, Miss Joyce MacMonagle and Mrs. T. E. MacMonagle.

1st Clay Modeling Class May '48

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First, they found that the tiny impulses of radiation from radium-bearing rocks could be counted and were regular and continual and that the regularity was a measure of their disintegration which required a long series of steps which extended over a period of from 5 to 6 billion years. Then by careful examination they found that only a little over one third of this element had completed the series of changes and become a form of lead. This showed that the rocks and the earth were about 2 billion years old.

Second, they studied the structure of many spiral nebulae and found that our particular spiral, the Milky Way, is about 100,000 light years across, is composed of about 100 billion stars many of which are in vast clusters, and that it is rotating at 163 miles per second. This high speed would pull all clusters apart in 15 rotations, but there are still many clusters in tact so that our spiral has not rotated more than half that often and is therefore about 2 billion years of age, similar to the above.

Third, they found by examining many of these spiral star systems that most of them appear to be receding from our position at speeds that increase in proportion to their distance from us. It was thus possible to show that these nebulae had begun to leave our area in space about 2 billion years ago.

Fourth, these men feel that in this three-fold answer to the problem they have given us a scientific background for creation as expressed in the Bible and for the sequence of events mentioned there. These three approximations then provide a fair estimate of the TIME element and show that the six days of creation must be construed as immense periods of time so that the doctor said nothing new and made no case against the Bible record.

W. G. COLGROVE.

London, August 30, 1950.

ay Modeling Society Formed

other society has been added ıe list of London's cultural ps with the organization of an t clay modeling society last t at a meeting in the H. B. Technical School.

O. Moore was elected tem- ry chairman for the organiza- which has not yet been given ıme.

program covering every stage lay modeling, from mixing the to the advanced stages of pturing and the making of ter casts, was outlined by the vener, Rev. W. G. Colgrove.

Instructor Named

r. Colgrove, who has had wide erience as an artist and sculp- will be the instructor for the up. He was employed by var- lithographing firms prior to service in the ministry. He also nded classes at the Canadian ademy of Arts and the National ool of Monumental Design, in ntreal.

he clay modeling society will et every Monday at 7.30 p.m. in carpentry shop at the technical ool. The program will include paration of modeling clay and ls, formation of geometric fig- s, a brief anatomical study of ng things, modeling birds, nts, fruits, fish and small ani- ls, copying designs and forma- n of original designs, architec- al modeling and modeling of human form.

PAGE TWENTY-SEVEN

New Group, 'Clay Guild' Fosters Art

By Ron Kenyon

IT goes in as a rather bumpy chunk of whitish clay. It comes out a kangaroo, a chipmunk, a pear, an elephant (withal with rather large ears) and a basket of fruit.

The kangaroo even has a clearly discernible baby kangaroo in her marsupial pouch, a notable triumph of its creator of the newly-formed London Sculptors' Guild.

* * *

Recently, the first step was taken to organize the guild and there are indications it is going to be the most successful of London's new art groups.

The group has had three meetings in the H. B. Beal Technical School under Instructor Rev. W. G. Colgrove, who took a year's course with the National Monument of Design, Montreal. W. O. Moore is president of the new guild and Edythe Stewart is secretary treasurer.

Clay Modeling Artists to Meet

A group of London sculptors are planning to take clay modeling out of the "something to keep little hands out of mischief" class.

A meeting will be held Monday night April 26 at 7.30 in the H. B. Beal Technical School to organize a group to study clay modeling and the related arts.

Anyone interested is asked to attend or contact Rev. W. G. Colgrove, who is acting as convener of the group.

What may have been the inspiration for formation of the clay modeling group was a recent address at a meeting of the Western Art League by Cleeve Horne, Toronto, well-known sculptor and painter and vice-president of the Ontario Society of Artists.

Mr. Horne predicted that clay modeling and sculpture are about to return to their former place as embellisments to architecture and as an extension to the present art courses.

April 23, 1948

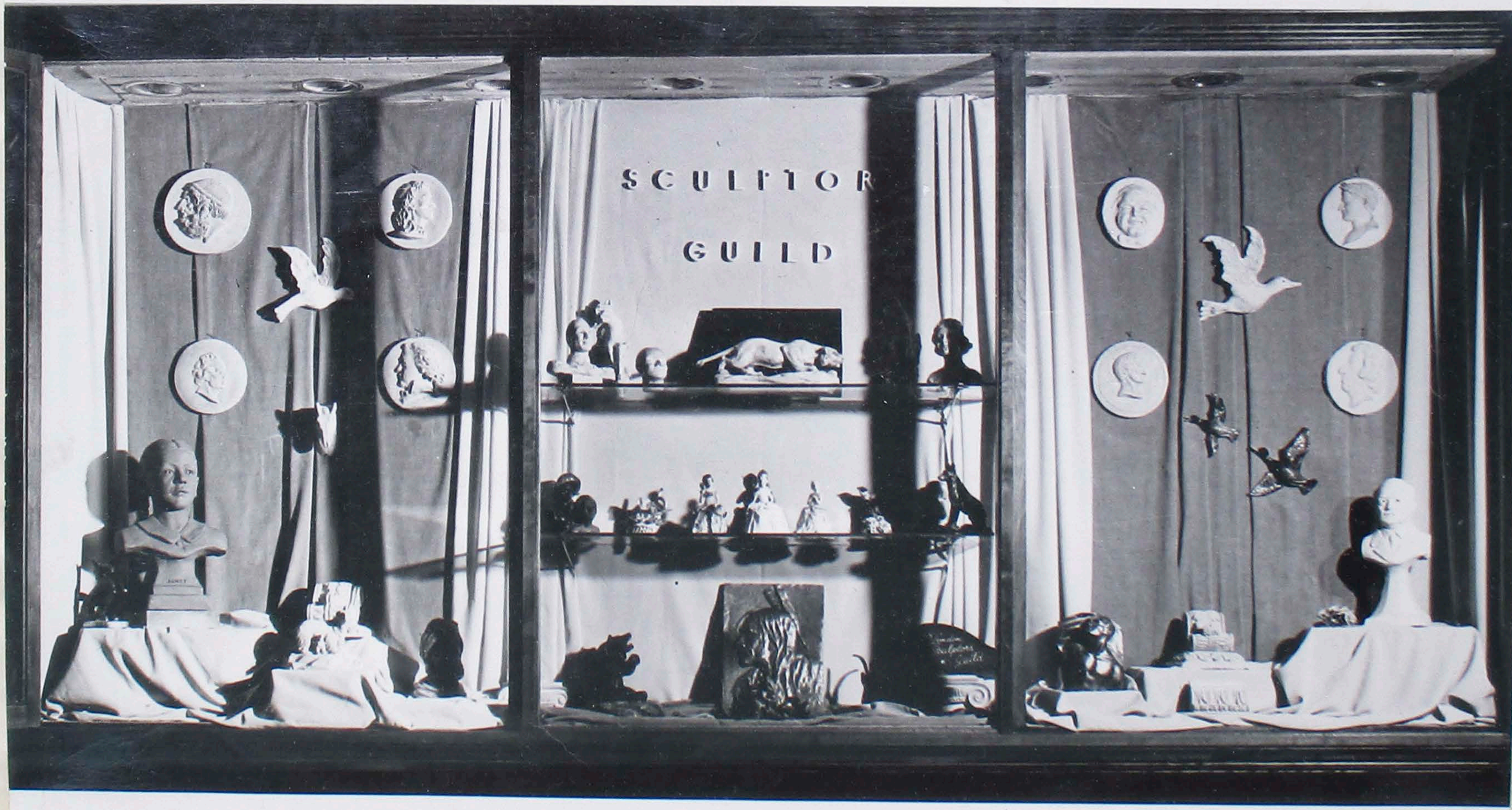
Films to Assist Clay Modelers

Formation of two clay modeling groups in London recently has awakened so much interest in this art that two films on the subject will be shown at the library Monday night, Clare Bice, curator of the Art Gallery, announced yesterday.

The educational films are for the general public, but especially for members of the two clay-modeling groups. One film, a National Film Board production entitled "Three Dimensions," depicts Canadian sculptors at work. The other, "Pottery Making," illustrates the process of making pottery and small figures.

The films will be shown in the south gallery at the library Monday night at 8.15.

3 feet high, both by W.G.C.



Display at the LIBRARY with ONT. ARTISTS' ANNUAL EXHIBIT. 1949.

An Answer to a Critic.

THE SCULPTORS' GUILD REPLIES

Editor, Free Press: We the members of the London Sculptors' Guild wish to thank you for this space today for the purpose of clearing up a misunderstanding which appeared in your paper last Thursday.

It is in connection with the exhibit of the Ontario artists at the library in which certain statements were made which we feel should be discussed briefly, and we have requested Mr. Colgrove to pass along our remarks to the Press.

In the first place we wish to say that it would be a lot better for the name of the writer of any critical article to appear with the article so that in case a reply is necessary, one could address the critic properly. Who is this guilty coward that could not bear the light? We challenge the writer to reveal 'its' identity. We cannot call it by any other than 'it'.

In the second place we notice that 'it' is quite naive and uninformed regarding certain phases of art and yet sets itself up as adjudicator in modeling, a field in which 'it' has had probably very little if any experience at all. Our display was asked for only a few hours before it had to be set up and any person, with half an eye, could see that much of it was unfinished. We placed it there on special request and now some 'it' of a self-styled critic takes a fling at it. We would welcome the findings of an able judge.

In the third place 'it' said that it was unfortunate that so many of our objects were copies. We wonder what 'it' expects folks to accomplish in modeling in far less than one year, actually about eight months. And why does 'it' display its ignorance of the regular procedure in teaching three-dimensional art, which is always from plaster or clay casts and therefore must be in the form of copies? Perhaps this outburst on the part of 'it' was nothing more than a bitter, childish jealousy stirred up by equally frustrated friends who failed to succeed.

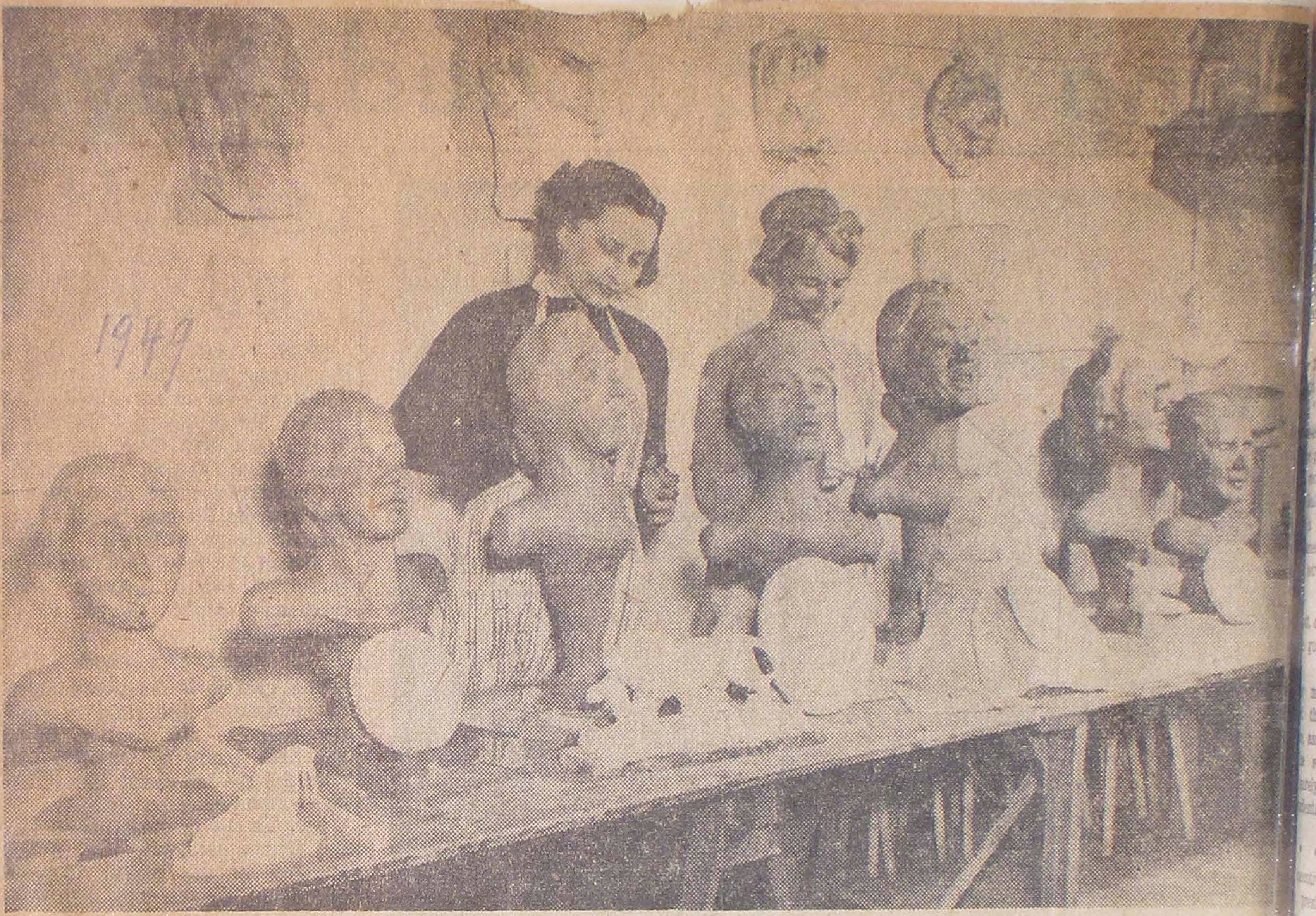
In the fourth place why did 'it' so gratuitously suggest the inadequacy of our very capable instructor? Surely this was totally uncalled-for, and we would not stoop to remark about it except for the fact that it is another display of ignorance on 'its' part. Maybe 'it' thinks our instructor is just a tumble-down old fossil that has ambled aimlessly through life and now in his advancing senility professes to be a sculptor. Will 'it' please read the following:

As a youth Mr. Colgrove won most of the prizes in the art classes here without having a single lesson. He then went to learn lithographic engraving and design and was soon elected secretary of the London Art Club over sixty years ago. Having completed his apprenticeship he accepted a position as foreman of the Peerless Lithographing Company in Rochester, N.Y., and attended night classes at the Athenaeum Art School where for his work in pen-drawing and water color sketches he won the annual prize. At this time also he entered a competition for the artists of Rochester which was offered by a perfume company of Paris, France, and to their dismay carried off the prize. Later he returned to London to become foreman of the Ontario Litho. Co., which was burned out at Christmas time and he obtained a position with the Montreal Litho. Co., and the following year was appointed foreman and shortly afterwards was asked to become a member of the firm. While in Montreal he joined Canadian Academy of Art for the study of life models and attended other night classes at the National Monument of Design in claymodeling. At the latter he won such recognition as to be invited to remain as a teacher and to become a sculptor but he could not accept because he was called to preach. In clay he has made a variety of pieces including objects in relief for advertising, two gladiators three feet high, and several portrait busts.

His degrees are from McGill, Western and Boston and include highest place in English under Stephen Leacock and the Board of Governor's prize in philosophy. And all three were accomplished without financial aid from any other source except his own skill in art in its various forms.

The committee in charge,

London, May, 1949.



1949

SCULPTORS AID L.L.T.—The Sculptors' Guild is lending London Little Theatre a hand with props for the forthcoming play "The Laughing Woman" which opens at the Grand Theatre on Monday evening. The play is about a sculptor, and part of it is set in his studio. Above are two of the 18 Guild members who worked on this eight of the 10 clay busts they made for use The sculptors are Doris Barons (left) and Fisher. The play is being directed by John B the third production in the current L.L.T. se

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So far work has been with modeling clay — sometimes called pipe clay because common clay-daub pipes were made from it.

Modeling clay has been used for hundreds of years by sculptors to design their work. Later they cut their marble according to specifications of the clay model.

* * *

Although the group is confining its efforts to small animals and fruits so far "to get the feel" of the clay, they have more important purposes in mind.

They believe that interest in architectural sculpture is reviving, and that the "square" modern buildings will give way to more beautiful ornamental buildings.

"There is a strong desire for a pleasing style," said Mr. Colgrove, "not necessarily a complete return to classic types, but something strong, graceful and ornate, which will express the finest artistry of this new age."

The clay used is a combination known chemically as hydruos silicate of aluminum. It is easily broken when dry — giving rise to the joke about the Irishman's broken clay pipe: "The Indian's pipe of peace is passing, but the Irishman's piece of pipe is here to stay."

Under nimble fingers, the modeling clay, clean and non-injurious to clothes, rose swiftly into models, and said Rev. Mr. Colgrove, "it was surprising how good they were."

Demand to organize the guild came spontaneously through many Londoners interested in sculpture, and Rev. Mr. Colgrove was asked to be instructor.

Although clay modeling is not absolutely necessary before the marble of a work of art is cut—for some sculptors work directly with the marble — it is common practice to first prepare a clay model.

* * *

It's likely to be a long time before the would-be sculptors get around to working in marble.

Meantime, it's kangaroos, and more kangaroos.

nensional Art

culptors to Open Season Monday

of the London
will resume their
-dimensional art
the studio of the
' Guild, 351 Clar-

pening will mark
season of classes.

*

8 by the Rev. W.
guild had its be-
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School. It now
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, of Westminster
guild's chief in-

members, who
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dents with prom-

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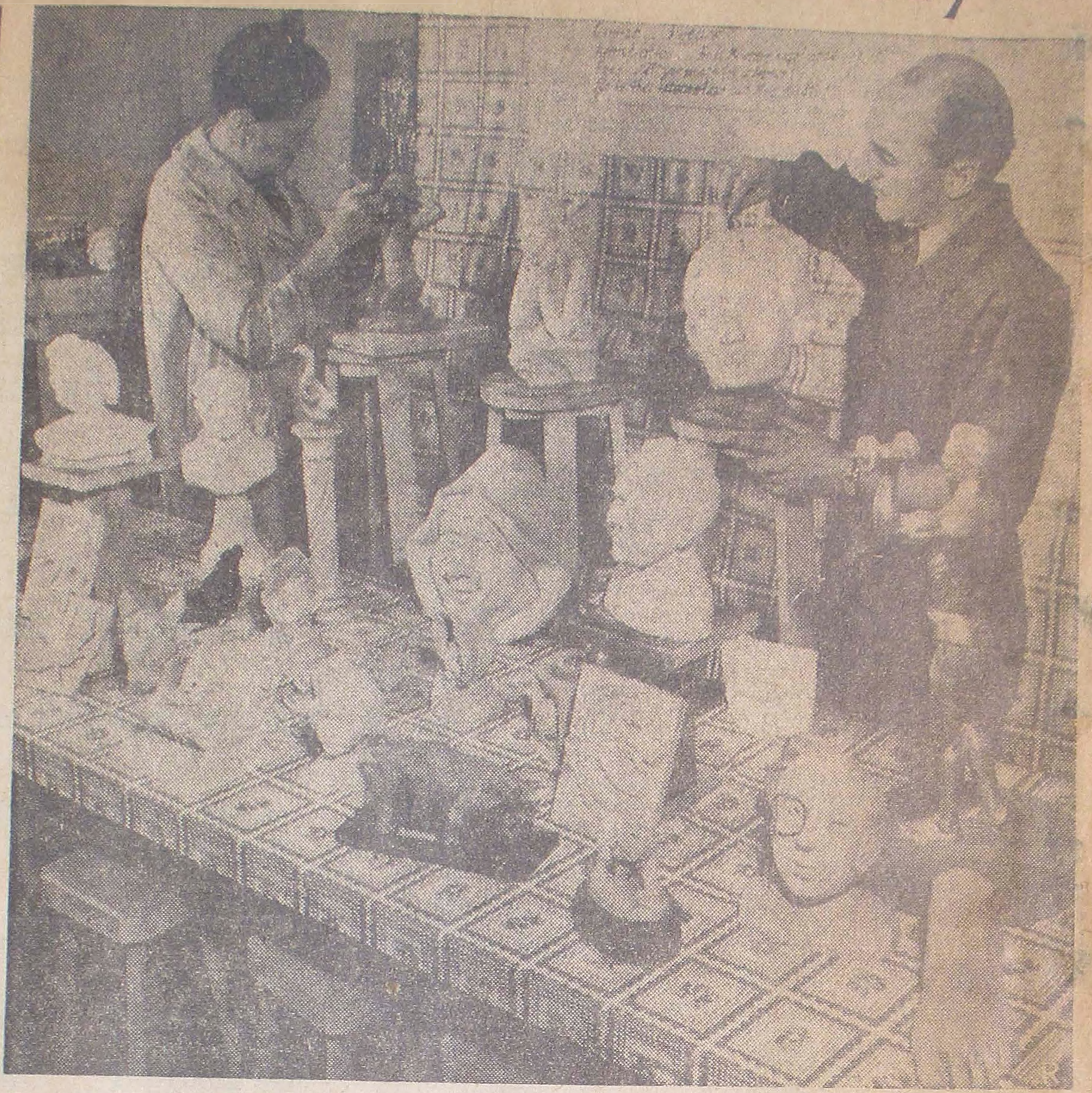
ecutive includes:
president; Miss
, secretary, and
, chief instructor.



Putting the finishing touches to two senior projects, in the studio of London Sculptors' Guild, at 351 Clarence street, are Miss Edythe Stewart, guild secretary, and W. O. Moore, president. In the foreground are some of last season's projects.

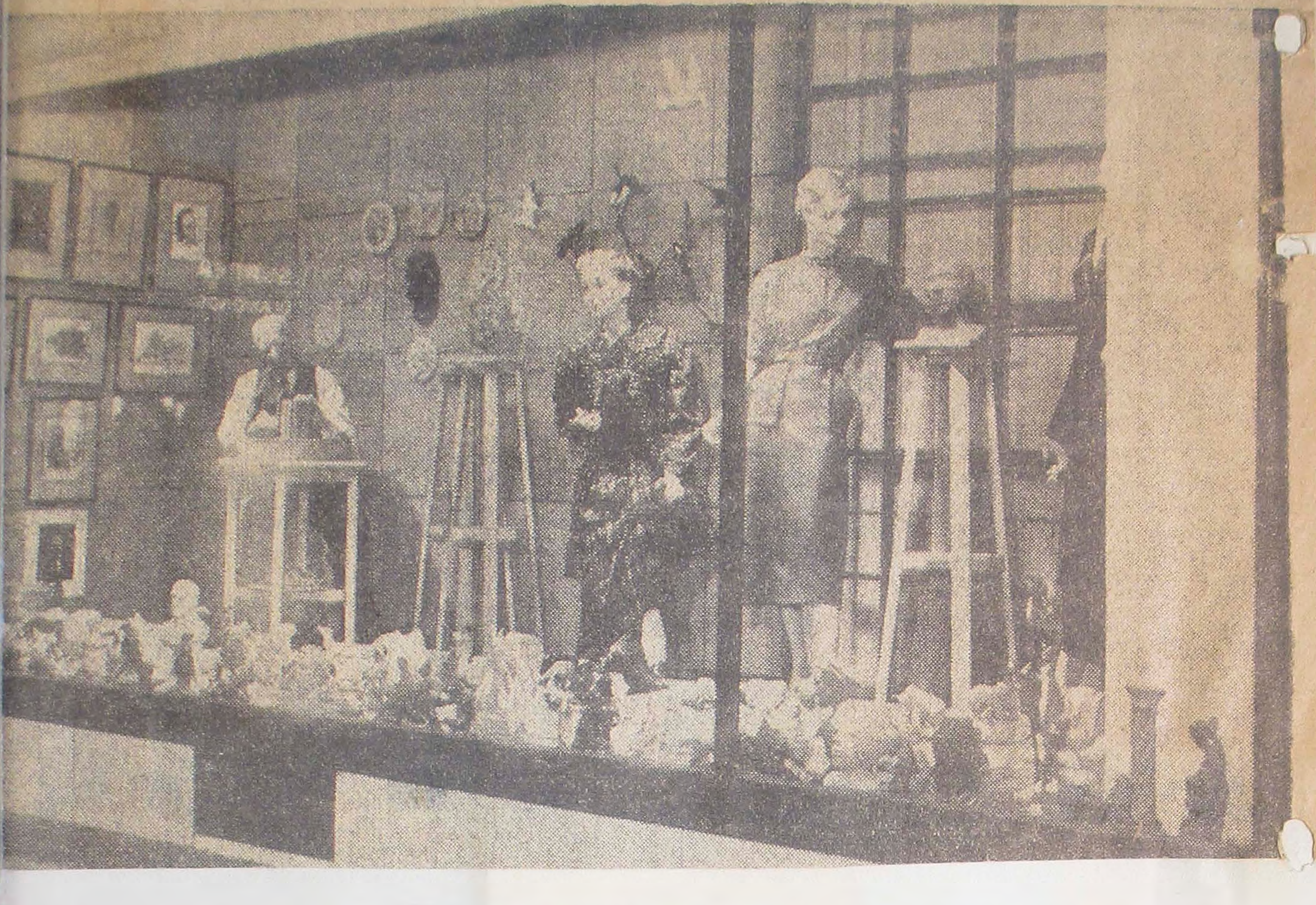
Sculptors' Guild Gets Tech Space

Equipment of the London Sculptors' Guild has been turned over to H. B. Beal Technical and Commercial High School, and members will be able to continue their work in ceramics classes of the school, it has been announced.

The Rev. W. G. Colgrove, who has directed the guild, has retired because of age.

Early in October, ceramics classes will reopen in a room being equipped in the addition to the school. During last year they were conducted by the technical school in Empress School. May 30, '52

London Sculptors to Give Demonstration



tore Displays Clay Sculpture

Work of the London Sculptors' uild is now on display in a chmond street window of Simpns.

During the dislpay the Rev. W. Colgrove, superintendent of the uild, and assistants will demonate sculpturing techniques in the ndow. All the modeling done in e windows will be with clay.

In the some 125-piece display e many busts, and figures of any types. There are models of uit and vegetables, animals, and uman figures.

The pieces on display are the ork of members of the Guild over e two year existence of the uild. Some sketches and drawings e also displayed.

In Third Year

The London Sculptors' Guild, with its new studios at 351 Clarence street, is now entering its third year.

A three year course is offered by the Guild. The first year consists in modeling towards ceramics, which is work in clay, such as dishes and small objects. In the second year the modeling is towards sculpture, still in clay, and in the final year the work is with clay and marble cutting.

Mr. Colgrove said anyone possessing fair artistic talent can become a guild member. Each new student is given a three month trial. At present the Guild works one night a week for 11 months. No school children are eligible for Guild membership, Dr. Colgrove said.

24 Members

There are 24 members in the Guild with the numbers evenly divided between the second and third years. When the Guild was organized by Mr. Colgrove two years ago there were 17 members.

Dr. Colgrove will be instructing the second year, and Dr. B. L. Guyatt, of Westminster Hospital will instruct the third. First year is still undecided.

The clay used by the Guild comes from several sources, Dr. Colgrove said. Good clay is obtained from Port Stanley and Port Burwell, he stated.

In the past two years the display has been at the Western Fair, but space at the Fair was limited this year. Through previous connections Dr. Colgrove obtained space at Simpsons.

W. O. Moore is president of the Guild and Edythe Stewart is secretary-treasurer.

The showing will continue until Monday.

Ada Gert.

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GEOLOGY

VIII

THE GEOLOGICAL SERIES

IMES	AGES	ERAS	PERIODS	YEARS DIAGRAM	SUBDIVISIONS
NOZOIC TIME	AGE MAMMALS	QUATERNARY ERA	RECENT GLACIAL	1,000,000	PLEISTOCENE
		TERTIARY ERA	EOCENE PLIOCENE MIOCENE OLIGOCENE	60,000,000 12,000,000 30,000,000 40,000,000	ENGLISH CRAG UPPER MOLASSE LIGNITE BEDS
SOZOIC TIME	AGE REPTILES	CRETACEOUS ERA	LARAMIE COLORADO DAKOTA LOWER	120,000,000	UPPER CHALK LOWER CHALK GAULT GREENSAND
		JURASSIC ERA	PURBECK OOLITE LIAS	155,000,000	PURBECK UPPER LIAS LOWER LIAS
		TRIASSIC ERA	UPPER MIDDLE LOWER	190,000,000	KOSSEN BEDS MUSCHELKALK BUNTER SANDSTEIN
TIME / . . PALEOZOIC . . / . TIME	AGE ACROGENS	CARBONIFEROUS ERA	PERMIAN	215,000,000	DOLOMITE LOWER RED SANDSTONE
			CARBONIFEROUS	300,000,000	UPPER COAL MEASURES LOWER COAL MEASURES
			SUBCARBONIFEROUS		MILLSTONE GRIT MOUNTAIN LIMESTONE
	AGE FISHES	DEVONIAN ERA	CATSKILL CHEMUNG PORTAGE HAMILTON ORISKANY	350,000,000	RED SANDSTONE CHEMUNG PORTAGE GENESEE SLATE HAMILTON BEDS UPPER HELDERBERG ORISKANY SANDSTONE
	AGE INVERTEBRATES	UPPER SILURIAN ERA	HELDERBERG ONONDAGA NIAGARA	390,000,000	LOWER HELDERBERG SALT BEDS NIAGARA GROUP CLINTON GROUP MEDINA SANDSTONE
		LOWER SILURIAN ERA	TRENTON CHAZY CALCIFEROUS ORDOVICIAN	480,000,000	HUDSON RIVER BEDS UTICA SHALES TRENTON LIMESTONE CHAZY LIMESTONE
		CAMBRIAN		550,000,000	L.M.U.CAMBRIAN
ARCHAEAN TIME	AGE OF NO LIFE	EOZOIC		1,200,000,000	LAURENTIAN
		AZOIC	(W .G.Colgrove)	2,000,000,000	HURONIAN

ROCK-FORMING MINERALS

THE SILICA GROUP

1. QUARTZ - Clear,cloudy,colored, Hard.7, Lust.glassy, Cleav.indistinct, Cryst.hexagon, Strk. white, Fract.conc.
2. CHALCEDONY- Similar in nearly all respects to No.1 but is duller and displays several colors at the same time.
3. OPAL;HYALITE - Hydrated, iridescent,amorphous, not crystaline, Opal is opaque or translucent and colored,Hyalite is transparent.
4. AGATE - Is a banded mineral,composed of layers of crystaline silica, chalcedony,jasper,amethyst,rock-crystal ,etc.
5. FLINT - A massive,impure variety of quartz,somewhat similar to agate but without its beauty or value.

THE FELSPAR GROUP

1. ORTHOCLASE - 1,2,3,are primary felspars. 1 is a potash,monoclinic type with cleavage at r.a. oblique,rhombic twinned crystala. H.6.
2. ALBITE ----- A soda,triclinic type with polysynthetic twinning and mostly a milky white color and glassy lustre.
3. ANORTHITE -- A lime triclinic type with polysynthetic twinning and various colors,but it is not very important in building.
4. LABRADORITE 4,5,6,are secondary felspars. 4 is a lime-soda, triclinic type with polysynthetic twinning and cleavage at oblique angles.
5. ANDESINE ------ A lime-soda triclinic felspar with similar twinning,cleavage and other characteristics.
6. OLIGOCLASE - A lime-soda triclinic felspar with similar characteristics. These three are combinations of 123.

THE FELSPATHOID GROUP

1. NEPHELINE -- A silicate of potash,soda and alumina obtained from lava.
2. LEUCITE ---- A similar silicate with less potash and more soda.
3. ANALCITE --- A mixture of the two above with added water.

THE MICA GROUP

1. MUSCOVITE -- A hydrated potash mica,clear like glass and elastic.
2. LEPIDOLITE - A hydrated potash mica,part of potash replaced by lithia.
3. BIOTITE ---- Similar to Muscovite but black by iron and magnesia.

THE MIXED AMPHIBOLE AND PYROXENE GROUP

1. ENSTATITE -- APyroxene but with less than five per cent of FeO.
2. BRONZITE --- A pyroxene with 5 to 14 per cent of FeO.
3. HYPERSTHENE- A pyroxene with more than 14 per cent of FeO.
4. AUGITE ----- A monoclinic pyroxene with colors green to black.
5. DIALLAGE --- A variety of augite but with laminated structure.
6. HORNBLENDE - Similar to augite and very important.
7. TREMOLITE -- A silicate of magnesia,pale green or white in blades.
8. ACTINOLITE - Like tremolite plus iron,similar to asbestos.

The first five are pyroxenes,the last three are amphiboles.

W. G. Colgrove

ROCK-FORMING MINERALS 2

THE TALC AND CHLORITE GROUP

1. CHLORITE ---Laminated, nonelastic leaves from decomposed hornblende, augite or magnesian mica.
2. TALC ------ Hydrated silicate of magnesia, seldom crystalized, soapy feel, flaky, nonelastic, from altered magnesian minerals.
3. STEATITE -- Soapstone, same composition as talc but may be harder, and is not foliated.
4. SERPENTINE Hydrated silicate of magnesia and iron, seldom crystalized, green or mottled, generally from decaded olivine.
5. KAOLINITE - Hydrated silicate of alumina, soft and plastic, from decomposition of felspars, especially orthoclase.
6. GLOUCONITE Hydrated silicate of alumina, iron, lime, magnesia, potash and soda, from decomposition of augite.

THE CALCARIOUS GROUP

1. CALCITE --- Carbonate of lime, has various crystal forms, when perfect it is Iceland Spar, from decayed silicated minerals and lime.
2. ARAGONITE - A harder and heavier calcite which, when heated, becomes a variety of calcite and falls apart in similar fashion.
3. DOLOMITE -- A carbonate of lime and magnesia which, although looking like calcite, is able to withstand cold acids.
4. SELENITE -- Hydrated sulphate of lime, separates into thin plates, It is the gypsum from which plaster of Paris is made.
5. ANHYDRITE - A sulphate of lime without water, harder and heavier than gypsum, with three cleavage planes which intersect at rt.a.
6. APATITE --- A phosphate of lime with chloride and fluoride of calcium which makes it a valuable plant food.
7. FLUOR-SPAR A fluoride of calcium, clear when pure, but it is seldom found in an unstained condition.

THE IRON GROUP

1. HAEMATITE - Ferric oxide colored grey or black and called Specular Iron. When dry and powdered it is red and an important source of iron.
2. LIMONITE -- A hydrated ferric oxide which is softer than haematite and yellowish in color and is often called brown haematite.
3. MAGNETITE - A black oxide of iron which is strongly magnetic and is an important source of iron.
4. ILMENITE -- A titaniferric oxide which is generally found in massive form and sometimes in rhombohedral crystals.
5. SIDERITE -- A ferrous carbonate, grey or brown, when mixed with clay it forms clay iron-stone.
6. IRONPYRITES A bisulphide of iron called Fool's Gold which comes in cubic crystals, is very hard and sulphurous.
7. MARCASITE - White iron pyrites which when left in the air for a few months breaks down to form a white powder.

These two pages give a fairly complete list of the rock-forming minerals found in the important rock areas of the world.

W.G.Colgrove.

EARTHQUAKES

Earthquakes are ordinary natural phenomena which originate within the ter crust of the Earth. They are seldom caused by volcanic action .This is the se with those of the quieter type such as the Mauna Loa volcano in Hawaii.

The intermittent type produces occasional shudders like Vesuvius in Italy.

The explosive type,e.g. Krakatoa in Java often cause quakes but seldom plode.In 1883 this one shot a cubic ton of matter 17 miles into the air and dark- ed the Sun over a wide area,and barometers around the world were affected.The cause the explosive action is in the sudden inrush of water upon the superheated rock low.But of all causes,the ordinary forces of nature are supreme in their endless sk of altering,shifting and disintegrating the rock strata on both the plains and untain ranges. In 1811 the town of New Madrid in Missouri was swallowed by an ormous cave-in caused by the collapse of the earth on which the town was built, derground waters had gradually carried away the earth beneath.

Faults,however,are the most prolific agency in the production of quakes. ey are the evidence of stresses and strains which indicate nature's effort to re- just the changes which are always slowly occurring in the earth.Adjustments are e order of the day,every day in the year,some are so silent that our seismographs not record them,while others are so destructive that the bottom of the sea may raised to the altitude of a mountain and the nearby land surface may suddenly ide down in its place. Displacements along faults may be horizontal or vertical or th and the best explanation to date is according to Reid who suggested the term lastic rebound".There are live or active faults and dead or inactive ones. The isastrous quake at California in 1906 has been found to be the movement of two reat coastal rock layers in opposite directions,north and south,and extending 00 miles through the San Andreas Rift. Displacement occurred along 290 miles and ences as well as roads were pulled apart for 20 feet in some places.

At the Owari earthquake in Japan one section was lifted 23 feet while nother was dropped about 20 feet. Sometimes no vertical movement occurs but great pen cracks spread over the section of activity to swallow houses and people.

When a minor quake occurs there may be very little disturbance such as appened in southwestern Ontario about 30 years ago. A movement of the earth passed nder our house,shook the windows and dishes but did no damage and made no noise.

When a major quake occurs there may be noises of various kinds such as umbling,roaring,rushing,booming,blasting,rending,artillary,thunder,~~or~~ crunching, eavy grinding,scraping or splitting. If it is sea-born it is called a tidal or ea-wave which rushes in upon the land spreading devastation in its wake.

In the study of earthquakes some very interesting instruments are used. he seismometer and the seismograph are most important and the latter's report ard is called a seismogram. These reports reveal the lighter shocks,called fore- hocks,while those that come after the main disturbance are known as after shocks, hich do not travel far but make short cuts to the instruments while the vibrations f the main shocks travel around the world. The after shocks are caused by the inal movements of readjustment and may continue for several days, as in Italy in 930 when their shudders caused some already weakened walls to collapse. To secure he time of an earthquake they have a special stop-clock operated by the seismograph. o determine the duration of the quake they lookup the speed of the record drum/m. o find its origin and distance they get records from 3 stations by radio system.

Geological changes caused by earthquakes are gas vents,land slides,vul- anism,faults,the raising and lowering of local areas,fissures,altered water supply, idal waves and great slow quiet pressures which cause the formation of mountain anges and continental subsidence or the disappearance of islands,to say nothing f the thousands of lost lives and the destruction of millions of dollars in property.

At many of the earthquake areas and at most important volcanic centres overnments have set up observatories to watch and measure the extent of damage done nd the amount of changes in land surface contour.

A brief list of the most destructive earthquakes known in modern times ust include such names as Lisbon in 1755, Caracas in 1812, Aleppo in 1822, aples in 1857, Quito in 1859, Manila in 1863, Valparaiso in 1880, Krakatoa in 1883, harleston in 1886, Japan in 1891, Mexico in 1892 and San Francisco in 1906.

W.G.Colgrove.

			COLOR	FORM	UTILITY	LEGEND
JAN.	GARNET	Granum grain	Wine red	12 to 24 sides	Gems Abrasives	Faithful Constant
FEB.	AMETHYST	Vs. bad habits	Violet	6 sides	Gems	Prevents passions passions
MAR.	JASPER	Jaspis Jasper	Dull colors	Crypto- Crystaline	Seals Vases	Wisdom Courage
APR.	DIAMOND	Adamas Steel	Glassy	Pyramidal Crystals	Gems Tools	Purity Peace
MAY	EMERALD	Smaragdus Gr.	Deep Green	6 sided prisms	Gems	Insures True love
JUN.	AGATE	Achates Gr.	Variagated	Pellucid and rough	Decoration	Health and Long life
JUL.	RUBY	Rubeus L.	Red	Crypto- crystaline	Gems	Discover poison
AUG.	SARDONYX	Sardion Gr.	Red/white	Alternate red and white	Cameos inlays	Wedded happiness
SEP.	CHRYSOLITE	Goldstone	Light green	Crypto- crystaline	Decoration	Stops Saddness
OCT.	OPAL	Opalus L.	Iridescent	Petrafied wood	Gems	Unlucky suffering
NOV.	TOPAZ	Topazus Id. in Red Sea	Various	Rhombic prisms	Gems	Friendship no bad dreams
DEC.	TUROUOISE	Turkey	Black-green	Kidney shape	Gems	Prosperity in love and life

THE PRECIOUS STONES

THE NEXT BILLION YEARS

A symposium from several writers

sident, Ladies and Gentlemen-

e 15 minutes alloted to me is so brief compared to the enormous period of time
h must cover that the ratio would be $\frac{1}{35 \text{ trillion}}$.

ofessor Reavely has told us a great deal about the advance of life and
ation on this earth up to the present. Now I must grasp the torch of knowledge
ry it onward and upward far into the dim uncharted future.

are convinced that mankind will doubtless inhabit this planet for many more
ds of years, perhaps for many millions, which I shall now describe. Man's stay
f course, depends on a number of ~~items~~ conditions - among them: the constitution of man
, the stability of natural law, the quality and quantity of supply and the
nowledge and inventive genius of men and women.

ecause of the changing physical conditions which are gradually taking place,
l have to rebuild himself to suit them. He will have to procure the raw materials
ry for continued existence and he will have to learn how to produce the products
need.

e are told that there are only two kinds of natural resources:
e that grow and reproduce themselves such as vegetation and
e that are static such as rocks and minerals. Of these, the former will naturally
very long time, but the latter will be gradually used up. Take, for example,
um, we are told that all known sources beneath the United States can supply only
oil to last about 30 years more - 1 billion barrels per year. And it is said
e various kinds of coal may last for perhaps 3000 years if the demand is not too
increased.

e other minerals and metals of the mountains and the mines are definitely limited
l disappear with the centuries but, by that time we hope man will have discovered
nessed other agencies and sources of raw materials.

e population of the world is about 2 billions or double what it was 100 years
aking the world as a whole there is said to be possibly sufficient non-renewable
es e.g. metals and minerals to last the slowly increasing population about 1000 years.
ever, all the people became Christians the supply would last indefinitely. But
out a billion years hence and what may be the world's condition then? Then! Then!
en? Why then there will be no world and no people on it for mathematical astronomy
answer and, if true, this entire planet will be destroyed by the moon before it
llion years old instead of being frozen as the heat-death theory suggests. But
that later.

e is tempted to speculate on what may happen to us and our successors as these
ms steadily pass into history or oblivion.

at is the present outlook? Let us make a brief survey. We shall doubtless advance
y field. Our present knowledge will lead us to economise with regard to our
resources and we shall gradually learn by research to create new commodities to
our increasing demand. We shall invent and discover the best ways of using
ing resources. In other words, we shall utilize every practical method and explore
romising atomic combination that appears in the realm of both organic and inorganic
ry.

e vast field of physics, both theoretical and applied, will be deeply, broadly and
vely cultivated because the efforts of man in these two extensive fields are
ly necessary to our continued existence on this planet. But that is not enough,
much more than mere existence and we shall need more natural energy to do the
s of work that grow out of our needs. We shall try to satisfy three very
t claims:- First, that of augmented man power by the development of a truly
ace through the unique contributions of applied biology and biochemistry. The
s, the glands and the vitamins will play a fundamental role. Second, that of
ed static resources which we shall find in the ocean from which we shall extract
ious chlorides and carbonates including sodium, calcium and potassium as well

aminum, magnesium, iron, copper, silver and gold. These will be still there
he mines and wells have ceased to produce. Third, that of more energy which we
capture from the sun which bombards the earth with 230 trillion horse-power
second. We shall also harness the tides with engines whose only limit is the
r that we can set up. We shall ~~begin to~~ unleash atomic energy.

But even with these three great needs satisfied, we cannot stop. We shall press
atter of the conquest of disease, we shall lengthen the life-span, we shall
senility and revive the dead.

While we are attending to these important developments we shall not overlook
equally interesting improvements. We do not intend to paint the lily or dye
unset but we do hope to bleach the blacks, tame the Huns and civilize the Japs.
intend to make marriage safe, even for angels. We do intend to eliminate the
ble alcholic and narcotic traffics. We do intend to slay the gambling evil.
intend to destroy the social vices. We do intend to make morality and
tuality supreme.

The animal we call man will be educated, cultured and controlled, not by
nal compulsion but by internal principle.

There is not time to discuss minor improvements such as:-
ges in manners, housekeeping and dress - or should I say undress?
" occupations, vacations and habits - perhaps the women will quit their nonsense and vote.
" hairdressing, moustaches and cosmetics - look at moustaches.
" food, diet and beverages - alcohol, dirty water and drugs.
" pets, games and toys - full-size mechanical animals.
" teaching, training and learning - That'll learn you.
" calendars, clocks and time - War time
" mathematics, astronomy and astrology - Befuddled nonsense
" art, architecture and sculpture - Epstein creations
" horticulture, agriculture and stock raising - crossing species
" music, song and poetry -
" theatre, drama and movies -
" thought, philosophy and theology -
" education, culture and travel -
" medicine, surgery and psychology -
" science, research and seance -
" language, literature and exploration -
" communications, commerce and treaties -
" radio, telephony and television -
" " politics, statecraft and warfare -
" " lax morals, superstition and pseudo-religion -
" " preaching, practicing and prayers -
a thousand other changes for which we must get ready.

I say, there is not time to discuss them just now - we must examine the
ronomic aspects of the subject. Let us turn to the sky.

A few years ago when men first measured the moon's distance, it was about 240,000
es away and revolved in about 29 days. Since that time we have learned that the
es exert a braking action on the earth's rotation equal to 20 billion h.p. so that
h succeeding century~~, measured by days,~~ will be almost 1 second shorter.

By the end of the first million years of man's existence this braking action
l have increased fifty-fold and the day will be a little longer.

By the end of 5 million years the human race will have reached its climax
d be perfectly adjusted to its environment and its individual members will doubtless
ve to the over-ripe old age of 3000 years. Everyone will be happy. Stanley Jones
id the four signs of old age are Baldness, Bifocals, Bridges and Bulges. Human
olution will have ceased and mankind will be rid of some of his ugly primitive
atures such as hair, nails and teeth but how could a man be happy if he couldn't
casionally bite his wife's ear? or how could a woman be happy if she couldn't paint
r claws? Its an old Egyptian custom.

e Next Billion Years.

y the year 8 million, the day will have become 48 hours long for the earth's ional speed will be only half what it is now while the moon will have added its present distance and its month will be 40 days long. Perhaps you gin to guess what will happen.

radually the moon will move farther and farther away and revolve more until the year 17 million when the earth's races will realize that their n this world will some day come to an end and they will seek safety on some planet. The ways and means for doing this will occupy the mathematicians, ists, chemists and inventors for thousands of years while a great variety of ments with space-ships of vast proportions will be made. At the same time series of experiments of another kind will be undertaken in an effort to p people capable of living with only 1/10 of the oxygen in our atmosphere ith a body temperature about 10 degrees higher than ours. These will be the passengers to fly to Venus and trips will be made in real earnest but not han 1% will arrive and land safely - nevertheless they will finally colonize the . It is said that such super humans will have developed several special senses s the ability to converse with anyone anywhere at any time by means of a new f television and a telepathic language. They will be able to swim in the air stretching the arm or leg or both, be able to reach anything within 25 feet. s the neck will stretch too. And when it comes to telling fish stories every will be a whale.

fter many more centuries the moon will have to turn back toward the earth the year 36 million, it will be only 1/5 its present distance away and will 25 times as big as the sun. It will raise the ocean level some 200 yards. s limit will soon be reached and the earth's attraction will cause great tidal s on the solid, rock-bound moon so that the surface will begin to crack and tire body disintegrate. About 1/20 of the heavens will be shut from view e sky will be filled with dust and fragments so numerous and so terrific in impact as to destroy all life that cannot escape. The meteor shower of 1833 ly a sand storm compared to this torrential avalanche of flaming rocks which ontinue to engulf the world for a hundred years and more until the whole ed earth will become a blackened cinder flying forever through the darkness netary space.

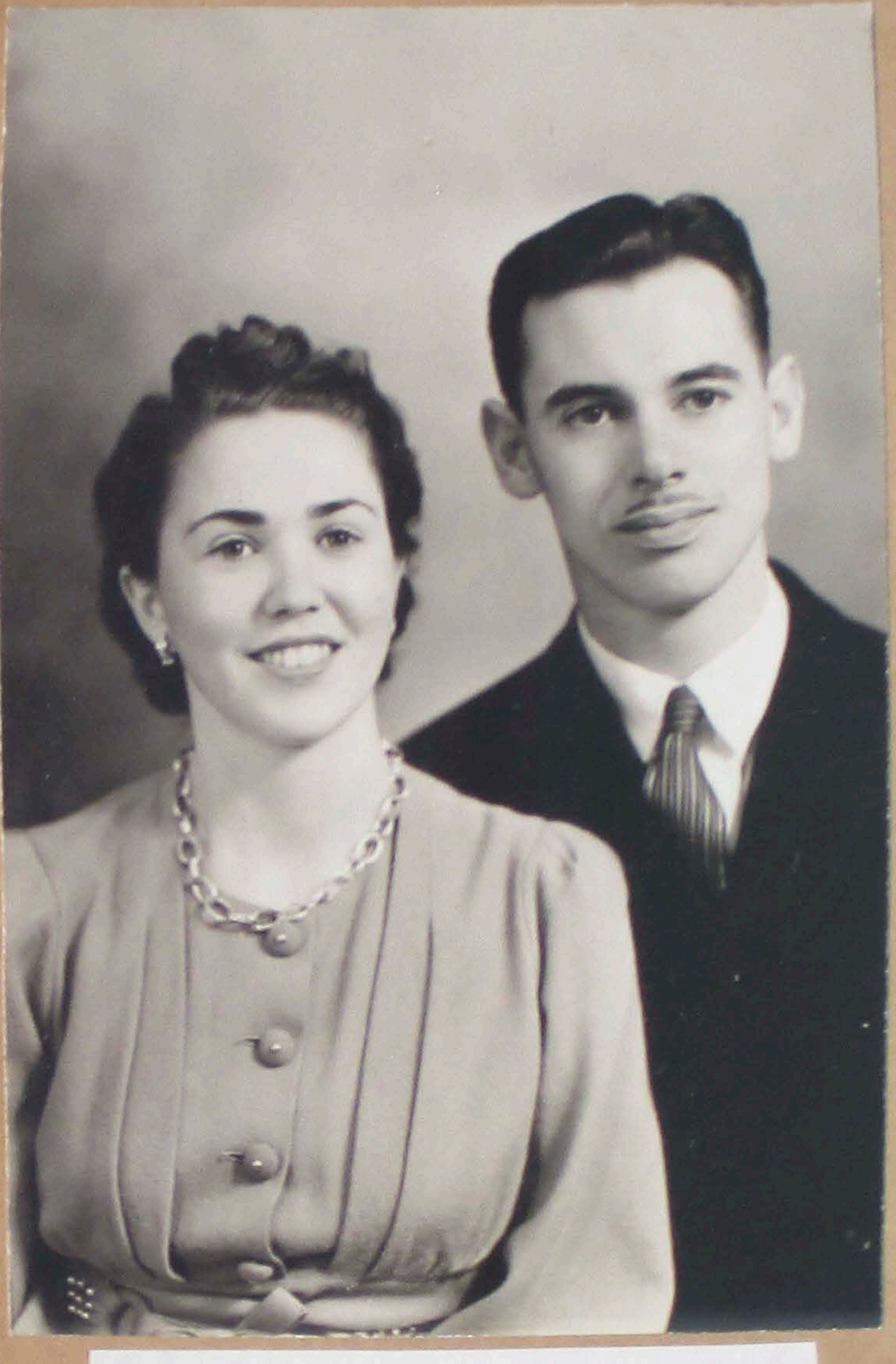
hile the major portion of the world is passing through this ghastly cosmic ust the remaining inhabitants on the other side will be fighting for room on nusian space-ships and most of them will get away before the fires reach them. enus will soon be overcrowded and the people will press for trips to Mars upiter but Mars will be bypassed because of its small size. At 1000 miles per hour rip from Venus to Jupiter will take about 50 years but what is that to folks who 60 times as long.

By the year 1 billion man will have become master of cosmic energies. The rays will be his active servants and he will spend his time in the study of the thrilling of all sciences - Astronomy. The vast cloud envelope of Jupiter will spelled by heat released from the interior until sunshine and shadow will alternate ey now do on earth. The speed of the planet's rotation will be slowed down by raking action of its eleven satellites to about 100 hours so that the day and will be 4 times as long as ours. (The year (12 of ours) will remain the same he number of days in it will be reduced from over 10,000 as now to about 1,000. nhabitants will not worry about the good old days on earth because the story ther earth and her midget tribes will have been forgotten for 100 million years. will it? Don't take it too seriously. Wait and see.

"Diana's Return Book" W. G. Colgrove.

HYMNS

IX

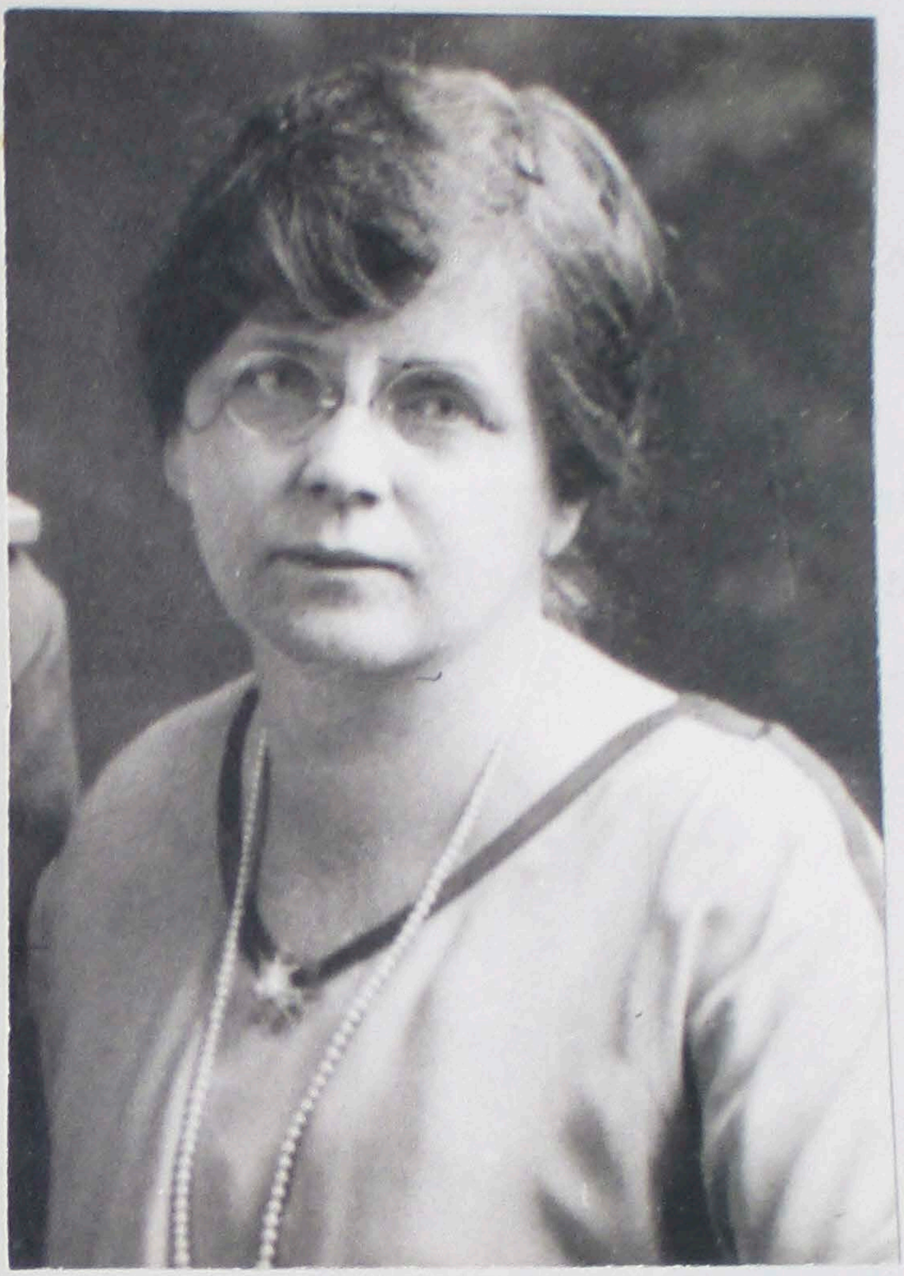


Dr.Gordon L. - Geologist,I.N.C.O.

THE HYMNARY

Enhanced by over four hundred corrections in language, poetry, psychology, theology and science. It is hoped that this will assist in clearer understanding of the meaning of the words which will lead to more intelligent singing.

W.G.Colgrove, M.A; B.D.



Mary Ann Colgrove,- Second Mother.

Hymn 1.

a 2, Line 1. Change- all the saints to elders all- because all the saints are not yet in heaven, and besides it is a picture from Rev.4.

" 4. Change- Which to Who- this needs no comment.

a 3. Line 1. Change- darkness to brightness- because the former is impossible and the latter agrees with 'glory' in the next line.

" 2. Change- may not to cannot- this will be scriptural and needs no further comment.

a 4. Line 2. Change- shall praise to reveal- because works do the revealing but cannot praise.

Hymn 6.

Made like Himself created man

a 2. Line 2. Change- Made us of clay to Created us- because clay is wholly incapable of conveying the divine qualities bestowed on man.

" 4. Change- brought to sought- because the former has the thought of coercion in it. In the same line it will be necessary to change- to to for- to agree with 'sought!

za 3. Line 3. Change- thousand to million- because, although it is used poetically, it fails to fit as in 1700.

za 4. Line 4. Change- rolling to passing- because time passes, it cannot roll.

Hymn 7.

zas 1 to 6. Change- aye to shall- because the latter is more suited to our age.

za 2. Line 1. Change- blaze to sound- because we don't blaze a name, we sound it.

" 2. Change- of gods He is the to He is our sovereign- because the statement is not true.

za 3. Line 2. Change- new-made world to universe- because the Creator was not limited to one member of the solar system.

za 4. Line 1. Change- piteous to pitying - because the former has two distinct and opposite meanings.

Hymn 8.

za 1. Line 2. Change- heavens to stars- because the heavens declare the glory, it is the stars that are said to rejoice or sing. See Job 38: 7.

za 2. Line 4. Change- Man to Son- because at His baptism God said He was His beloved Son.

za 3. Line 1. Change- wants, your to needs and- because we do not think God is interested in our 'wants'.

za 4. Line 1. Change- one empire to and Saviour- because the word empire is entirely out of place there.

Hymn 10.

za 2. Line 2. Change-He to Who- because it is smoother. Also eliminate the semi-colon.
" 5. Change- He to and- for the same reason.
za 3. Line 1. Change- pours to gives- because usually a gift is given, not poured. Then change- on to to to agree with 'gives'.
" 3. Change- labouring to troubled- because there should be only two syllables.

n 12, Stanza 3, line 4. Change to - No human line can sound.

Hymn 13.

za 1. Line 3. Change- wakes to gives- because bliss is a gift not something asleep in the mind.
za 2. Line 1. Change- Chance to Time- because it is far better.
za 3. Line 3. Change- the mist His to Himself the- because it is much better.

Hymn 14.

za 2. Line 3. Change- fight to task- because the former makes one think of a brawl.
za 4. Line 4. Change- essence to spirit- because the former does not contain the idea of personality.

Hymn 18.

za 1. Line 2. Change- bright to great- because majesty is not bright but it is great.
" 3. Change- beautiful to glorious- because it is more suitable.
" 4. Change- burning light to shining state- because there is no heat, and 'state' will suit 'great'
za 2. Line 1. Change- dread to long- because a period of time has ~~length~~ duration only, not dread.
" 3. Change- day and night to evermore- because there is neither in heaven. Change prostrate to joyous.
" 4. Change- Incessantly to Unceasingly- because the former has a connotation unsuitable here.
nza 3. Line 1. Leave this stanza out because its adjectives are very poorly chosen.
nza 4. Line 1. Change- O how I fear to How I revere- because ~~of~~ the fear has a meaning that the writer had to offset in the next line.
" 3. Change- trembling to trusting- because the former is not a suitable adjective for 'hope'.
nza 7. Line 3. Change- prostrate to erect- and- lie to stand- because we are not the slaves of a tyrant.

Hymn 20.

nza I. Line 2. Change - flames to gleams The sun and stars do not burn.
nza 3. Line 1. Change the whole of this stanza to-

Our midnight is a darksome shade,
Caused by the cloud of sin we made;
Thy presence makes our midday ~~fair~~, fine
Our happy eventide is Thine.- because God does not withdraw His smile, we turn away. A noontide cannot be a dawn.

nza 4. Line 3. Change- blazing to glorious - because more suitable.

Hymn 21.

tanza 2. Line 5. Change the last half of this stanza to
His wondrous creation,
Its power and law
Excites admiration,
And cultivates awe. Because the other is very old fashioned and even silly.

tanza 6. Line 8. Change- lisp to sing- because the former has a number of meanings.

Hymn 22.

tanza 1. Line 2. Change- dreadful to sacred- because it is better.
" 6. Change- awe to joy- because it also is better.

tanza 2. Line 6. Change- stammering to feebler- very few stammer.

tanza 3. Line 2. Change- fragrance to cadence- because the former is not a quality of praise.
" 6. Change- Ceaseless accented to In ceaseless grateful- because it is more euphonious.

Hymn 23.

tanza 2. Line 3. Change- ravished to thankful- because the former has an un-savory meaning.

tanza 4. Line 3. Change- sins and sorrows sunk to sin,Thy pardon sought- because the soul is not renewed except through pardon.

tanza 5. Line 3. Change- worlds to realms- because there are no worlds in heaven.

tanza 6. Line 1. Change- day and night to in Thy sight- because when death occurs there is no day or night.
" 2. Change- Divide Thy works no more to I dwell for evermore- because day and night never divided God's works.
" 4. Change- Thy mercy shall adore to Thyself shall I adore- because we do not adore mercy but God.

Hymn 25.

tanza 2. Line 5. Change- all to much- because we are not asked to give up all,especially its knowledge.
" 6. Change- wisdom,fame,and power to sin and evil power- because this is common sense.

tanza 3. Line 3. Change- eagle's to angel's- because birds don't fly so high.
" 6. Change- power to Himself- because,as said before, we do not adore one's qualities.

Hymn 27.

tanza 1. Line 4. Change- Original to Artificer- because God was not the original of anything unless you hold with a certain sect that God made all things out of Himself.

tanza 2. Line 1. Change- unwearied to ~~welcome~~ brilliant- because it is better.

Hymn 27 cont.

na 3. Line 3. Change- to the listening earth to through each fleeting hour- because we are not listening to it.

" 4. Change this line to- Reveals the greatness of His power- because it is not the Moon's birth that is being considered but God's power.

na 5. Line 1. Change- all to they- to agree with day which follows.

" 2. Change this line to- Appears to span the sky each day- because the motions mentioned are only apparent, not real.

na 6. Line 4. Change- hand that to One who- because this example of synecdoche reduces the range of thought.

3 4 Line

1. Change burn to shine, because they do not burn.
2. " in their turn to by design, to agree with shine.
3. " as they roll to without rest, because they don't roll.
4. " pole to pole to east to west, it will reach more people.

Hymn 28.

na 2. Line 1. Change- rolling sun, the changing light to spinning earth and day and night- because the sun does not roll and the changing light is day and night.

" 2. Change- night and day to yonder sun- because it is better.

" 3. Change- has writ to didst write- because the former does not agree with light. Change confess to express, it's better.

na 3. Line 1. Change this whole stanza to-

The sun and stars convey Thy praise
To the whole earth as it proceeds,
So may Thy Gospel in these days
Proclaim the Saviour's gracious deeds.- because this stanza is poorly constructed and the idea that truth 'touched and glanced' is very bad.

Hymn 30.

na 3. Line 4. Change- presence working to power doing- because it takes power to do work.

na 4. Line 1. Change- Nor let Thou to Let not our- for the sake of euphony.

na 5. Line 1. Change- on to with- because both come from God.

" 3. Change- Make pure Thy children's erring to Help us to do Thy holy - because God does not make us do anything, He helps us.

" 4. Change- their to our- to agree with 'our' in other stanzas and thus continue the personal plea.

Hymn 35.

za 1. Line 3. Change- What time to Whene'er- because it is more modern.

za 2. Line 3. Change- grasses to flowers- because the blossoms of the grasses are almost invisible.

" 7. Change- unremaining to evanescent- It is better.

za 3. Line 1. Change- canst to dost- because no one knows that God cannot sleep. It is said He rested once.

Hymn 40.

za 1. Line 3. Change- He plants His footsteps in the sea to By His command the raging sea- because the former is meaningless.

Stanza

Hymn 40 cont.

1. Line 4. Change- He rides upon the storm to Subsides into a calm- because the former is also meaningless.
2. Line 1. Change- the whole line to- Secure within His vast confines- because it is more reasonable.
4. Line 3. Change- Behind a frowning to Within an untoward- because we are getting away from the old idea that God is cross with His children.

Hymn 47.

2. Line 1. Change- God of God to True Son of True God- because the Son is the specific object of our adoration.
" 2. Change- Light of Light to Light of Light eternal- because it is difficult to sing as it is.
" 3. Change- the whole line to- Our human nature He hath not refused- because it is high time we stopped referring to the Virgin's womb, in our hymns, anthems and oratorios.
" 4. Change- Very God to Son of the Father- because it is difficult to sing as it is.
3. Line 4. Change- Glory to God to Sing ye, All glory- because it is much easier to sing.
" 5. Change- In the highest to To God in the highest- because this completes the change over to a much better form for congregational singing.

Hymn 54.

2. Line 3. Change- The gates of brass before Him burst to The powers of hell before Him quail- because the former is not true, and is a poor figure.
" 4. Change- iron to sinner's- because He came to set the prisoners free.
3. This is so poor that it should be eliminated.
4. Line 2. Change- bleeding to sinful- because the former is strictly out of place.

hymn 56.

1 to 4 This entire hymn is so in need of correction that one wonders how it ever got into the Hymnary.

hymn 59.

2. Line 3. Change- Late in time behold Him come to Just in time behold He came- because He came in the fulness of time.
" 4. Change- Offspring of a virgin's womb to All His children to reclaim- because, as remarked before, it is time to stop singing about that organ.
" 7. Change- Pleased to Chose- because it shows His own will acting in that direction.
3. Line 1. Change- heaven-born to new-born- to agree with the refrain, which has the same words.

Hymn 67.

taza 1. Line 6. Change- and to in- because the two are one, so 'and' is entirely out of place.
taza 2. Line 2. Change- angelic to heavenly- for euphony's sake.
" 4. Change- upon to of the- also for euphony.
taza 3. Line 1. Change- choir to throng- because the N.T. says there was a multitude of the heavenly host.
" 2. Change- the whole line to- Poised for a moment and burst into song- because that line is very unfinished and broken.
" 4. Change- And heaven's whole orb to So that the heavens- because heaven has no shape. physical.
" 6. Change- upon to on the- for euphony's sake.
aza 4. Line 1. Change- enlightened to startled- which is truer to the circumstance.
" 5. Add ed to return- to continue the past tense.
" 6. Add ed to burn- for the same reason.
aza 5. Line 6. Change- man's first heavenly state again takes to we once more regain our proper - because we are to reach that place by faith and works.

Hymn 76.

aza 1. Line 7. Change- life to flesh- because the former is not tainted.
aza 3. Line 4. Change- Thine almighty to Thy reviving- because it is more suitable.
" 6. Change- wisdom's heavenly lore to strength for every chore- because that is what the hands need to accomplish work.

Hymn 77.

aza 2. Line 2. Change- remembered to devoted- because the former has no meaning here.
aza 3. Line 3. Change- Unto My Kingdom ye may not come to Ye cannot to My kingdom come- because this line is worse than poor. The word may is especially objectionable.
" 4. Change- But may not enter in to Nor even enter in- because it makes better sense.
aza 4. Line 4. Change- worldly to anxious- this is Jesus' thought.

Hymn 80.

aza 3. Line 5. Change- All the soul of man did move to Like the throne in heaven above- because the former is too far fetched.
aza 6. Line 6. Change- Is my Father's heaven to Is my earthly heaven- because the former is not true.

Hymn 85.

aza 4. Line 3. Change- sapphire to heavenly- because the former is unsuitable.
aza 5. Line 4. Change- God to Christ- because the whole hymn is about Jesus.

Hymn 87.

1. Line 2. Change- Without to Outside- because the former is ambiguous.
4. Line 3. Change- unlock the gate to show us the way- Is heaven a walled city? Doesn't Peter carry the keys of heaven? No!
" 4. Change- Of to To- to agree with the above.

Hymn 88.

1. Line 1. Change- wrapt in grief to full of grief- it's better.
" 5. Change- fire to ire- because the former is definitely incorrect.
" 6. Change- Till its light alone to Until not a dreg- because the former is forced.
2. Line 2. Change- wouldst to didst- which is more correct.
" 4. Change- In the desolation ~~there~~ to And Thy dedication- because the former is unsuitable.

Hymn 97.

3. Line 4. Change- we gather to develop- because it is better.

Hymn 98.

a 1. Line 1. Change- Beneath to Before- because the cross is not like a tree but rather like an altar.
" 2. Change- fain would to now will- the former is too weak and inactive.
" 7. Change- From the burning of the noontide heat to A shade from noontide burning heat- for euphony.
a 2. Line 7. Change- The wonder of His glorious love to The glory of His wondrous love- because love is wondrous not glorious.
" 8. Change- own worthlessness to unworthiness- because even a sinner is not worthless.
a 3. Line 1. Change- take to seek- one cannot 'take' a shadow but he can seek it as a shelter.
" 5. Change- Content to let the world go by to I cannot let the world go by-
" 6. Change- To know no gain nor loss to With all its sin and loss-
" 7. Change- My sinful self my only shame to I must do something in His name-
" 8. Change- My glory all, the Cross to Who died upon the Cross- because this latter half of the stanza is self centred and unworthy.

Exercise Hymn 115. Stanza 3. Line 1. Change - Lord to Prince. Line 2. Change- power a sceptre sways to word an order gives. Line 4. Change to And henceforth ever lives. Because the Prince of Peace needs no sceptre and the 4th line is very poor.

Hymn 133.

za 1. Line 3. Change- thunder to glory- because more suitable.
za 2. Line 2. Change- are to and- because the former is an error.
za 3. Line 1. Change- pang to thought- because it is better.
" 4. Change- Faint for the flaming to Long for the coming- because the former is strained.

Hymn 140.

a 5. Line 2. Change- fold to flock- because if the author had spent more time on it he could have saved himself the use of an unnecessary figure of speech.
" 4. Change- We learn that love grows cold to They learn Thy love to mock- because it carries forward the idea in the first two lines.
a 6. Line 2. Change- yet to still- because 'yet' is improperly used, even if license is permissible.
" 4. Change- Arise,and never set to Help us to do Thy will- because others are not doing it.

Hymn 157.

a 1. Line 4. Change- make to help- because God does not 'make' us do anything.
a 3. Line 1. Change- Hast Thou not bid me love Thee,God and King to Thou hast bid me love Thee,gracious King- because a negative question is weak.
" 2. Change- All,all Thine own,soul,heart,and strength, and mind to With all my ransomed soul,strength, heart and mind- because the former is too disconnected from the first line thought.

Hymn 161.

a 4. Line 1. Change- awful to gracious- because more suitable.
a 6. Line 1. Change- depths to heights- because of the two words 'upwards'and 'high' in the following lines.
" 2. Change- starry to heavenly- because the former is too materialistic.

Hymn 169.

za 4. Line 2. Change- The catholic,the true to Around the world, the true- because so many people associate the word 'catholic' with the Romish church.
" 4. Change- broken frame to weakened faith- because the former is totally unsuitable.

Hymn 187.

za 1. Line 7. Change- pants to yearns- because the former has another meaning that doesn't aid devotion.
" 8. Change- O to Thou- which is far better.
za 2. Line 1. Change- Bless Thou the truth dear Lord to Bless Thou the sacred truth- because the change will get rid of the repetition in line 2.
" 2. Change- To me, to me to Dear Lord,to me- as in line 2 of stanza 1.
" 7. Change- my to Thy- because it is the peace of God that is sought.

Hymn 189.

za 3. Line 3. Change- blasts to cause- needs no comment.

Hymn 195.

Stanza 1. Line 1. Change- Sweet to Bright- for good reason.
" 3. Change- sweetly to silent- for equally good reason.
" 4. Change- Upon to Into- because a feeling does not arise outside but inside of us.
Stanza 2. Line 2. Change- poorman's to workman's- because many men who are not poor do work and need rest.
" 3. Change- things to days- the reference is to days.
" 4. Change- wings to rays- because healing comes from the rays of the sun.

Hymn 196.

Stanza 1. Line 3. Change- And with awe appear to As we humbly kneel- because 'awe' is out of place since we are not in God's actual presence.
" 6. Change- Prostrate lie to Lowly bow- because God is not a tyrant, we don't have to grovel.
Stanza 2. Line 3. Change- crowds to throngs- as more suitable.

Hymn 200.

Stanza 1. Line 2. Change- land to realm- as more suitable.
" 4. Change- land to world- as also more suitable.
Stanza 4. Line 8. Change- Shower, O shower them, Lord, on me to Shower them, O Lord, on me- because the former is lacking in euphony, and rhythm.

Hymn 208.

Stanza 1. Line 2. Change- behold to surround- because the former has a sense of distance about it.
Stanza 2. Line 3. Change- Such ever bring Thee where they come to That bears Thee where so e'er they roam- because the former is only a jumble of words.
" 4. Change- And going take Thee to their home to Yet always have Thee in their home- because these two lines now make sense.
Stanza 4. Line 2. Change- sweeten to lighten- because it is better.
Stanza 5. Line 3. Change- rend to from- because 'rend' sounds like the wish of some fanatic. Cowper was a great poet but very peculiar at times.

Hymn 211.

Stanza 1. Line 5. Change- suddenly to quietly- because all was dark and silent.
" 6. Change- Rang to Spoke- for the same reason. The author refers to it in stanza 3 as a whisper.

Hymn 213.

Stanza 2. Line 1. Change- done to past- because ' done' almost rhymes with 'run' at the end of the line. That is not desired.
" 2. Change- count to note- it would be much better.
Stanza 5. Line 4. Change- unsimple to ignoble- this is better too.

Hymn 214.

Stanza 1. Line 4. Change- kneeling to bowing- because we stand to be dismissed.
Stanza 3. Line 1. Change- through this approaching to throughout the coming- because the former is clumsy.
" 2. Change- Turn Thou for us its darkness into light to And out of darkness bring us into light- because 'darkness' cannot be changed into light.

Hymn 219.

Stanza 1. Line 4. Change- folds to holds- it is more natural.
Stanza 2. Line 1. Change- cries to said- the former is weak.
Stanza 3. Line 4. Change- offspring to children - it is better.

Hymn 220.

Stanza 1. Line 1. Change- I to I'd - because we do not see Him face to face, but we would if we could.
" 3. Change- firmer hand to clearer thought- because one cannot grasp grace with his hand.
" 4. Change- all to in- it is better.
Stanza 2. Line 2. Change- drink with Thee to would I drink- because we do not drink with Him.
Stanza 3. Line 1. Change- of banquet and of song to to confess my wrong- because the former sounds like a drinking party.
" 3. Change- feast and feasting to stay and staying- because the eating and the drinking are but symbols of a memorial while the fellowship is important as part of the sacrament.
Stanza 4. Line 2. Change- feast to hour- because it never was a feast in any sense except that of fellowship.
Stanza 7. This is an anticlimax and full of feasting. It therefore should be eliminated.

Hymn 221.

Stanza 1. Line 6. Change- wondrous banquet to celebration- because, as stated above, it was not a banquet.
Stanza 4. Line 5. Change- banquet to meeting- for the same reason.

Hymn 230.

Stanza 2. Line 4. Change- all His followers to His disciples- because the twelve were the only ones present.
Stanza 5. Line 1. Change- cries to said- 'cries' is very weak.
" 2. Change- that lies to that's dead- to agree with it.
Stanza 6. Line 3. Change- pour to be- to agree with the next line.
" 4. Change- In memory of My dying hour to Of Me a deathless memory- because this sacrament is not observed to memorialize His death only.

Hymn 231.

Stanza 2. Line 2. Change- Rich banquet to Fair symbols- enough said.
Stanza 3. Line 2. Change- hearts inflamed to wills subdued-
" 3. Change- Father's to Saviour's- enough said.
" 4. Change- pleasure or the profit to sacred consecration- because it is better.

Hymn 249.

Stanza 1. Line 3. Change- stretch from shore to shore to spread from pole to pole- because the former is too limited.

" 4. Change- Till moons shall wax and wane no more to While love shall every life control- because the continuance of the phases of the moon are not a proper measure of the spread of God's kingdom.

Stanza 2. Line 1. Change- For Him shall endless prayer be made to To Him shall every prayer be made- because we do not pray for Him,and endless prayer is impossible. If someone holds that'Him' refers to the kingdom, we would remind him that this stanza has nothing to do with the kingdom but only with the person of Jesus and praise to Him.

Stanza 3. Line 2. Change- Dwell on to Shall tell- because that is the function of the Christian tongue.

" 3. Change- infant to youthful- because infants are too young to proclaim anything like that.

" 4. Change- Their early blessings on to Their loud hosannas to- because'blessings' begins the next stanza and with a different reference.

Stanza 4. Line 3. Change- eternal rest to their needed rest- because this stanza refers to this life only.

Stanza 5. Line 2. Change- Peculiar to His grateful- because the former has a connotation that is unsuitable.

Hymn 275.

Stanza 1. Line 2. Change- Whose Spirit breathes the active flame to Our faith is focused on Thy name- because the idea of a fire within us is as old as Democritus about 400 B.C.so it was unwise for Wesley to use it here.

Stanza 2. Line 3. Change- the kindled fire to a deep desire- because we're not on fire inside.

Stanza 3. Line 2. Change- a present Saviour Thou to we pray,by Thy right hand- because it is to agree with the new 4th.line.

" 3. Change- hope to ask- because we are told that we shall receive what we'ask'for.

" 4. Change- Future and past subsisting now to Although we do not understand- because future and past cannot come together except in the present,and it is zero so far as duration is concerned.

Stanza 6. Line 3. Change- The Invisible appears in sight to The truth is clear,the vision bright- because the former is impossible.

" 4. Change- And God is seen by mortal eye to As God illumes the inner eye- because the former is also impossible.

Hymn 276.

Stanza 3. Line 6. Change- For O my God, it found out me to And thank the Lord,it rescued me- because the former is very awkward and unpoetic.

Hymn 249.

Stanza 1. Line 3. Change- stretch to spread- because it is better

Hymn 287.

anza 2. Line 7. Change- to-morrow to morrow- because 'to' makes
the line awkward and it is unnecessary.

Hymn 293.

anza 1. Line 1. Change- the second'my' in this and the next line
to and for euphony.
tanza 4. Line 5. Change- flesh to mind- because it is better.
" 6. Change- satiate to fully- also for euphony.
tanza 6. Line 1. Changes as in the first stanza.

Hymn 322.

tanza 3. Line 2. Change- space to time- reason obvious.
tanza 4. Line 2. Change- behind to within- reason equally obvious.
tanza 5. Line 1. Change- His sacred unction to O Holy Spirit- the
reason here is quite plain.
tanza 6. Line 2. Change- nature's every path to every evil path-
because nature is not unfit for us.
tanza 7. Line 2. Change- me out to to me- needs no comment.

Hymn 343.

tanza 2. Line 1. Change- only to holy- reason obvious.
tanza 5. Line 4. Change- Pattern to Saviour- reason also obvious.

Hymn 348.

tanza 6. Line 4. Change- Light to Life- how did Whittier do it?

Hymn 354.

tanza 1. Line 6. Change- If to Since- make this change also in the
8th.line. There should be no doubt.
tanza 3. Line 7. Change- make to help- as said before God does not
'make'us do anything.

Hymn 356.

Stanza 3. Line 2. Change- Always only for my King to Praises to my
God and King- because it is silly to limit the
Christian's range of songs to religious topics.
Stanza 6. Line 4. Change- Ever,only,all for Thee to Thine for all
eternity- for the same reason.

Hymn 359.

Stanza 1. Line 3. Change- Destitute,despised to Every sin I have-
because the former is not true of most people.
Stanza 2. Line 1. Change- Perish every fond to Strengthen every good-
because the former is uncalled for.
" 3. Change- Yet how rich is to Thus enriching- because
that would naturally follow.

Hymn 387.

Stanza 1. Line 1. Change- crying to saying- because it sounds weak, even if the author does not suggest tears, it puts Jesus in a poor light.
" 6. Change- free to thee- because it is better.
" 8. Change- the first send me to O Lord- because the former is not scriptural. This same change should be made in the last line of stanza 4.
Stanza 2. Line 2. Change- heathen to ancient- which is much better.
" 3. Change- heathen to needy- which is a lot better.

Hymn 403.

Stanza 1. Line 4. Change- to Jesus for refuge to for refuge to Jesus- because the former was a silly alteration from the Methodist Hymn Book by someone without poetic sense. Please notice the first part of the line.
Stanza 2. Line 2. Change- the first 'I' to For- because the two 1st. personal pronouns so close together sounds silly. How did such a blunder slip by the committee?
" 4. Change- righteous back to gracious which is far more suitable.
Stanza 3. Line 2. Change- woe back to sorrow which is much better, and leave out 'thee'.
Again we ask how it was that these utterly uncalled for changes escaped the notice of ,or were agreed to by the committee? They are all from the former Methodist Book,but that would not matter if they could be defended from any intelligent angle.

Hymn 408.

Stanza 3. Line 1. Change- scorn to weigh- because some praise is helpful,especially if carefully examined.
" 2. Change- lose to work- it is better.
" 3. Change- shame to love- because love was the basic quality that caused Jesus to endure the shame.
" 4. Change- thee to to- because it makes sense.

Hymn 409.

Stanza 1. Line 3. Change- blood-red to crimson- it is nicer.
Stanza 3. Line 1. Change- eagle to inner- it is more suitable.
" 2. Change- pierce to see- the former is overdone.
Stanza 6. Line 2. Change- gory to tawny- it is too bloody.

Hymn 411.

Stanza 2. Line 3. Change- lies to foes- because lies make up only one class of enemies, foes is much more inclusive.
Stanza 5. Line 3. Change- dew come down to sunshine comes- because dew does not come down but forms.
" 4. Change- Rest to Smile- it is more suitable.

Hymn 412.

Stanza 1. Line 6. Change- framed to sang- it is more suitable.
Stanza 2. Line 1. Change- yet to still- 'yet' is not proper here.
" 2. Change- tender to sacred- it is much better.
Stanza 3. Line 1. Change- yet to still- same reason as above.
" 3. Change- regret to through ill- Jesus had no regrets.
" 4. Change- faithless to erring- it is better.
" 5. Change- the second through to and- for euphony.
Stanza 4. Line 1. Change- heart to midst- it is more suitable.
" 2. Change- peal and to give a - it is better.

Hymn 428.

Stanza 7. Line - This whole stanza is a poor anticlimax when compared with the stately strength of the foregoing stanzas and their brilliant philosophy. Let it be discarded and forgotten. Tennyson wouldn't mind.

Hymn 439.

Stanza 1.Line 3. Change- Come,and with us,even us,abide to Come with us Saviour and abide- for the sake of euphony.
" 4. Change- Who would to For we- because it is not that we 'would' but that we do rely on Him.

Hymn 441.

Stanza 2. Line 3. Change- fire and back to fiery- it is superior. May we ask again why such a poor change was ever allowed by the committee? see the Methodist Book.
Stanza 3. Line 3. Change- Death of death and hell's Destruction to Guide me through the veil of darkness- because the former was a very silly change from the Methodist Book,which,nevertheless,we do not follow since we wish to get away from the pagan idea of crossing a river to reach heaven.

Hymn 452.

Stanza 1. Line 2. Change- arm hath bound to law controls- it is better.
" 3. Change- bidd'st to made- it is much better.
In the fifth line of the first three stanzas change- cry to pray-

Hymn 453.

Stanza 1.Line 2. Change- The surging planets onward roll to The circling planets seek their goal- because planets neither surge nor roll.
" 6. Change- children to pilots- it is more suitable.
Stanza 4. Line 2. Change- ethereal to aerial- because they have not succeeded in reaching the so-called ether yet.
" 6. Change- children to heroes- it is more suitable.

Hymn 456.

Stanza 1. Line 2. Change- unsunned to shaded- it is far better.
Stanza 3. Line 2. Change- home's pictures to and air with- better.
Stanza 5. Line 2. Change- And both to I am- as much better.

Hymn 461.

Stanza 4. This should be cast out as far too pessimistic. Who would ever sing it except an Augustine who had lived a life of sin.

Hymn 463.

Stanza 2. Line 2. Change- shall decay to flee away- shadows do not decay,the figure is too forced.

Stanza 3. Line 1. Change- O one,O only mansion to How glorious are Thy mansions- for the sake of euphony. Then too there are many of them,not one only.

Stanza 4. Line 3. Change - O sweet and blessed country to The place of glad reunion- because the repetition adds nothing to the thought,but this change does add.

Stanza 7. Line 3. Change- song to shout- it is more suitable.

" 4. Change- shout to song- because we shout at a victory and we sing at a feast.

Stanza 8. Line 3. Change this in the same way and for the same reason as for stanza 4 line 3.

Hymn 464.

Stanza 1. Line 3. Change- Infinite to Eternal- because infinite has to do with space and eternal with time. Besides it is not euphonious in that the accent in'infinite' falls on the first syllable which spoils rhythm. And may we add that the whole hymn is unworthy of a place in any modern hymnary because it is all about an imaginary river we have to cross to get to heaven. This is materialistic,impossible,pagan and childish. Away with such nonsense.

Hymn 465 Stanza 2 Change O Christ! He to Of Christ who

Hymn 476.

Stanza 1. Line 4. Change- joined with back to love and- Just why somebody made this silly change from the Methodist Book is beyond our understanding. Why did they spoil the rhythm and leave out 'love'? How did it escape the committee,or did they agree?

Hymn 479.

Stanza 1. Line 3. Change- Salvation to Redemption- because the death of Jesus did not bring about salvation but only redemption. Salvation depends on man's acceptance of redemption by faith followed by his working out his salvation also by faith.

Stanza 3. Line 1. Change- fullness to knowledge- it is far better.

" 3. Change- The blessed rest from inbred sin to Salvation free from every sin- because redemption takes care of inbred sin if accepted by faith.

Hymn 482.

Stanza 4. Lines 2.3.4. Change to But seldom thought of Thee,
Till pardoning grace my heart restored,
And set my spirit free.

Hymn 483.

Stanza 3. Line 1. Change- clasp Thy hand in mine to place my hand in Thine- because it is much safer.

Hymn 486.

Stanza 2. Line 1. Change- wants to needs- it is better.
Stanza 3. Line 3. Change- hand to arm- because it is scriptural.

Hymn 488.

Stanza 3. Line 1. Change- yet to still- 'yet' is more in place just after a negative,as not yet.
" 3. Change- forget to fulfill- because 'forget' is unnecessary after Divine forgiveness,while to fulfill the promises to the one forgiven is just what ought to be done.

Hymn 489.

Stanza 4. Line 3. Change- Throw wide the door,each willing mind; to From pole to pole,the world around,- because this is more inclusive.
" 4. Change- And be His empire all mankind. to Till every sinning soul is found.- because it makes clear that we should be actively engaged in the search,not leaving it to each individual sinner to make his own advances and contacts.

Hymn 494.

Stanza 1. Line 6. Change- All the enticing tones of ill to All enticing forms of sin- because 'tones of ill' is a very weak expression.
" 7. Change- mild,melodious to clear and regnant- this is more vigorous and meaningful.
" 8. Change- all is still to cannot win- because this adds the idea of victory and gives promise of the conquest of the misgivings,doubtings,yearnings, griefs and despair in the following stanza.

Hymn 496.

Stanza 8. Line 1. Change- Yes,and when that world's glory to Tell me the story fully- because the former has always been a stumbling-block on account of its lack of rhythm and euphony.
" 2. Change- Is dawning on to That it may win- because that is primarily what the story is intended to do.

Hymn 505.

Stanza 1. Line 5. Change the second 'gaze' to muse- because it adds the thought of pondering.
" 7. Change- image to power- for good reason.

Hymn 505 cont.

Stanza 3. Line 2. Change- I behold Thee as Thou art to I desire the better part- because the former is impossible.
" 6. Change- every to spirit's- needs no comment.
" 7. Change- Compasseth me round with blessings to Fills my soul with richest blessings- because the former is very awkward.
Stanza 4. Line 1. Change- lift Thy face to keep Thine eyes- because lifting ones face has another connotation now.
" 5. Change- my to Thy- because that is what it should be and likewise in the next line.

Hymn 514.

Stanza 2. Line 4. Change- On earth, and fire to Throughout the earth- because there is here an echo of the four elements of early Greek philosophy.
Stanza 3. Line 2. Change- Inarmed to Unarmed- because the former has still the idea that some protection is needed.
Stanza 4. Line 2. Change- young-eyed to seraph-this gets rid of the unexplained reference.
" 4. Change- undiscordant to ever joyous- why use a double negative?

Hymn 516.

Stanza 1. Line 5. Change- yet to still- and do this also in stanzas 2.3.and 4.- for reasons previously mentioned, then change the last line in each stanza to- That we may learn to do Thy will- because it is the only way to get rid of war. Then too the repeated negative 'Lest we forget' is no help.

Hymn 518.
Hymn 529

Stanza 4. Lines 1.- 4. This stanza is so bad we cannot make it worse so let us try, or let it be eliminated.

We pray, O God, in anger do not scorn us,
Nor leave us to vainglory's arrogance;
In time of trouble be Thou ever near us,
Thou art our Rock, our adequate defence.

Hymn 529.
Stanza 2. Line 1.
Change- misspent to each day.
Stanza 4. Lines 3.
Change- night to day.

Hymn 530
Stanza 1. Line 4.
Change- to Life, and to in strength of
Stanza 2. Line 2.
Change- Have to Are all
Stanza 4. Line 1.
Change- the second old to and
In Line 4.
Change- and care to we bear
Stanza 5. Line 2.
Change- all to what

Hymn 530

Hymn 538.

Stanza 2. Line 2. Change- Falls the soft to Forms the moist- because dew does not fall and it is moist.

Hymn 543.

Stanza 1. Line 2. Change- Fall from the darkening sky to Reveal the starlit sky- because the shadows do not fall.
" 3. Change- Upon the fragrance of the flowers to Upon the fragrant leaves and flowers- because shadows cannot rest on a quality like fragrance.
Stanza 2. Line 3. Change- Before Thy mercy rise to Before Thy throne arise- because that is proper.
" 6. Change- Upon to Above- because it is so.
" 7. Change- With to While- because it is necessary.
" 8. Change- on to from- it is better.

Hymn 548.

Stanza 2. Line 1. Change- The sun himself hath vanished to The sun has set in splendor- because it did not vanish but only disappeared.
" 2. Change- By conquering darkness banished to And made the night so tender- because darkness does not banish the sun but is itself caused by the sun.
" 3. Change- By darkness foe of day to Close in upon the day- because light is the foe of darkness and controls it.

Hymn 573.

Stanza 3. Line 1. Change- dream to gift- it is not even like a dream.
" 2. Change- as a stream to seems to drift- 'time' does not really move but only seems to do so.
" 3. Change- Glides to Quite- is more suitable.

Hymn 580.

Stanza 1.Line 3. Change- The hand that to The One who- because the former does not do justice to the Creator.
" 5. Change- heaven to space- because that is the source of the earth's cold.
Stanza 2. Line 5. Change- throbbing vein to artery- this needs no comment.

Hymn 601.

Stanza 2. Line 3. Change- in His bosom to on His shoulders- because that is what Luke tells us.
" 6. Change- fetches to carries- it is easy to understand and sing.
Stanza 3. Line 1. Change- lonely night to darkness- because the former is too long.

In this list there are 330 changes and nearly all explained. Many other hymns need minor corrections not listed here.

The Lord's prayer should be changed to read as follows:-

Our Father, who art in heaven,
. . . .

As we have forgiven those who trespass
. . . .

And lead us not into trials
. . . .

Forever.

W.C.Colgrove, March 1947.

INSTRUMENTS

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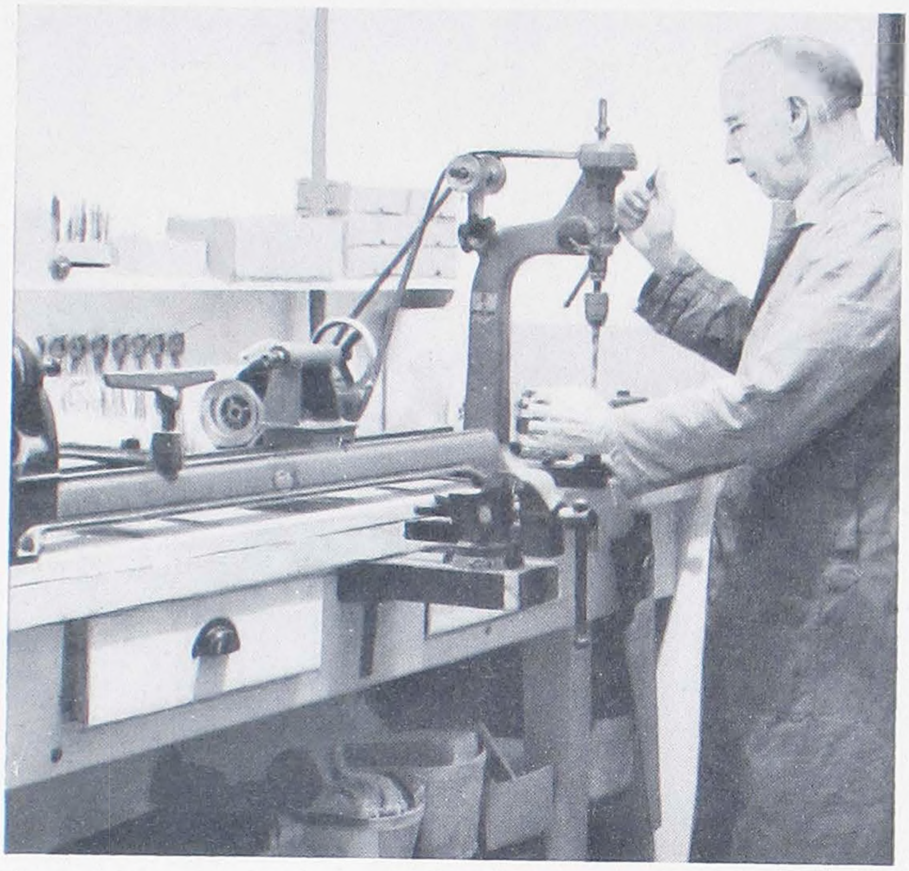


REV. W. G. COLGROVE, M.A., B.D.

To whom was awarded the Chant Medal for 1942.

In the instrument shop of the Hume Cronyn Memorial Observatory
University of Western Ontario, London, Ont.

London Ex-Minister Invents True-to-Life Astronomy Gear

Any time now, students of astronomy at University of Western Ontario will see in use a piece of demonstration equipment that is unique because it is "true to life."

This apparatus, most recent of many invented by the Rev W. G. Colgrove, retired United Church minister and former university instructor, shows what actually happens between the earth and the sun. While previous equipment used for instruction has moved the sky across the earth or the sun across the sky, as appears to happen, Mr. Colgrove's invention moves the earth around the sun, which actually is what takes place.

Displayed at Library

Although university students won't see this apparatus until it is put into use as an instruction unit, Londoners can have a look at it right now at the public library. It is part of a display by the Royal Astronomical Society of Canada, London centre.

On view to the public for a week are various pieces of astronomical equipment, most of it made by Mr. Colgrove, and much of it used at the university.

One piece the university hasn't used, Mr. Colgrove said, although it has it, is present under the title of "stellar radiant." This is a round ball, which the inventor said can be called the earth or the sun——it doesn't make any difference because they are so close together in relation to the stars. From the ball go out wires of varying lengths, each tagged at the end with the name of a star.

50 Brightest Stars

Included are the 50 brightest stars, placed at comparative distances from the earth, and in their proper positions in the universe. Mr. Colgrove explained that if any one wire star is pointed at its counterpart in the universe, all the other wires will point directly at their stars.

One of the most interesting and significant objects displayed looks like a lot of twisted wire held up by two thin rods. It is used by Mr. Colgrove to illustrate that planets rotate along a path like a corkscrew, and that the sun doesn't stand still, but travels through space at a rate of 367,600,800 miles a year.

Mr. Colgrove has traced the course of several planets in wire around a straight rod, which is the sun's path. All have been figured to scale.

Earth Movement

The earth moves in a rather tight corkscrew because it circles the sun in one year. Even at that, Mr. Colgrove figures it travels 706,500,000 miles in one year.

Jupiter, the largest spiral on the apparatus takes 11.86 years to get around the sun, and travels 5,608,860,000 miles while doing it.

Mr. Colgrove stopped at Jupiter, because if he had included Pluto, which takes 248 years for one turn around the sun, his scale model would have been about 65 feet high.

LONDON, ONTARIO, JANUARY I, 1950

To the Board of Governors of the University of Western Ontario I,William G.Colgrove of this city wish to report the results of my labor of some years in several departments of the University.

Before making the list,however,may I say a few words about my preparation for what follows,namely that my academic background includes three university degrees from different universities and many years as an artist in several media. The degrees were B.A.with the Board of Governor's prize in two philosophies from Mc.Gill; M.A.from Western for an assigned thesis on The Nature of Moral Law; and B.D. from Boston University Theological College.

My experience in art may be summarized briefly. I was born with an unusual capacity for seeing values in line and color and for quick delination of people and things in perspective. I had never had a lesson in drawing but entered the annual tests on request and carried off most of the prizes.As a result I became an apprentice at lithographic engraving and design where I spent the next four years and then answered a call to the Peerless Litho.Co. of Rochester ,N.Y. and in two years became foreman of the Montreal Litho.Co. While in Montreal I was a member of the National Academy and the Monument of Design where my skill in Clay modeling led to my being asked to give up my theological course and become a sculptor. This,of course,I could not do because I was about to enter Mc.Gill for my fourth year that fall. When September came and I revealed my university plans the proprietor called me to his office and said,"If you will stay with us we will make you a member of the firm". This was a strong bid but I said,NO.

Having finished at Mc.Gill,Iproceeded to Boston for my three-years course in theology and student preaching. After a dozen years I was appointed to the Coral Street charge in the city of Worcester,Mass. At the end of two years I sold the property and planned and built a new parsonage and modern church but the great flu epidemic took my wife and I had to return to London,Ont.In a few months I was asked to be superintendent of the school for returned disabled men until I joined the London Conference of the United Church in 1921. While preaching I became greatly interested in history and archaeology and drew up an extensive chart of world history down to the Christian Era.

My retirement from the ministry occurred in 1937 and I was released to do many things which had been long on my mind. Having greatly enjoyed the sciences at Mc.Gill I immediately began collecting botanical specimens and soon had about 500 pressed,mounted and named to give to the University. Then I was asked to undertake the reorganization and classification of 17 smaller collections with a view to incorporate them with the original Morton collection. Little by little the herbarium grew to 14,000 specimens. This done I had the pleasure of an extended trip to the west coast during which I botanized the prairies near Calgary and the Turner Valley,also Stanley Park and the hills of Vancouver Island where I spent a glorious week at the great Observatory.

The second department which claimed my interest was that of ZOOLOGY to which I gave a box of tiny English sea-shells and for which,with money obtained from the late Mr.Ed.Reid of the London Life Co,I purchased many fine bird skins and mammal pelts.

The third department in which I was interested was that of GEOLOGY where I helped prepare labs,labeled rocks,put new motors in the rock-polishing machine and made some minor improvements in the diamond-saw machine. My interest here was increased because my son had received its Gold Medal.

The astronomical department, however, possessed more fascination for me and, having lectured a great deal as a member of the extension department, I was given charge of the new observatory before it was opened and have been there ever since, now 10 years. During my stay at the observatory I have been able, with help from Dr. Kingston, to invent and construct several unique and original astronomical teaching aids which would be far more popular if they could reach the market awaiting them all over this continent. The list follows--

1. The Manual Planetarium with 9 planets and 15 moons. Also graduated setting circles, offsets for eccentricity and seasons.
2. The Motor Planetarium with the four nearest planets and geared to show the various configurations of the planets.
3. An unfinished Mechanical Planetarium for schools without hydro. It will do the same operations as No.2.
4. A set of large Planets to show their relative sizes with one another and the sun. A sun 9 feet through requires an earth 1 inch in diameter.
5. An unfinished set of large Planets same as No.4. They are ready for their last coat of paint when needed.
6. A scale model of the Helical Paths of the five nearest planets. It shows that these bodies travel much farther and faster than indicated.
7. A scale model of the Helical Path of Pluto which shows the same and is built so that 1 inch represents a billion miles.
8. A scale model of Mars and its two tiny moons. This shows how one moon rises in the east while the other rises in the west and both move in the same direction.
9. A Comet Tracer which shows the position and direction of motion of an unseen comet or other similar body.
10. The first small model of the Sotellunium built of egg-beater gears. This, of course, is a Sun-Earth-Moon System.
11. The first large brass-geared Sotellunium built with the help of Mr. Pye and in the University machine shop.
12. The New Improved Sotellunium which has been sold to Universities in Canada and the United States and to some Secondary Schools.
13. The New small Sotellunium intended for schools without hydro. It ~~empl~~ uses an ordinary flashlight for the sun.
14. A Special Sotellunium for the study in detail of Solar and Lunar eclipses and their relationships.
15. The large Planeto-zodiac with the Solar System in the centre and the constellations around the edge.
16. The medium Planeto-zodiac with segments of the horizon around it which shows the seasonal orientation of the ecliptic.
17. The small Planeto-zodiac which, like the other two, shows not only the apparent rising and setting but also the positions of sun, moon and planets.
18. A large composite picture of the Moon carefully assembled from 18 separate photographs taken at Lick Observatory.
19. A large roller Star Map which shows stars and constellations 70 degs. north and south of the equator. Nearly 1,000 stars are included,
20. The Constellarium which represents the stars of any constellation in their proper spatial relation to oneanother.
21. Three Stellar Radiants--one with the 100 brightest stars, another with 50 and a third with 30 stars. When set, these stars point to those in the sky.
22. A simple Spectroscope which shows an expanded continuous spectrum with its seven colors clearly displayed.
23. A three-foot model of the Galaxy showing its two giant arms amd our probable place on one of them.
24. A two-foot model of the Galaxy which, like the larger one, rotates on its axis and has a tiny model of the sun and earth in its midst.
25. A portable model of the famous Foucault Pendulum which demonstrates the rotation of the earth on its axis.

26. A chart of Sun-spot activity for 100 years showing the eleven-year cycle with its maximum and minimum dates and numbers of spots.

27. The eight Masonite Cases for the transparencies with the small opening for the description of each.

28. The Dresden Meteorite in its curved-glass case with a drawer containing several supposed meteorites.

29. Three demonstration telescopes of different kinds with various attachments and equatorial mountings.

30. The scale model of the 200 inch Hale Telescope with its mirrors and its unusual methods of manipulation. Scale 1/40 Of the original.

This with some others have given to the Institute for the Blind.

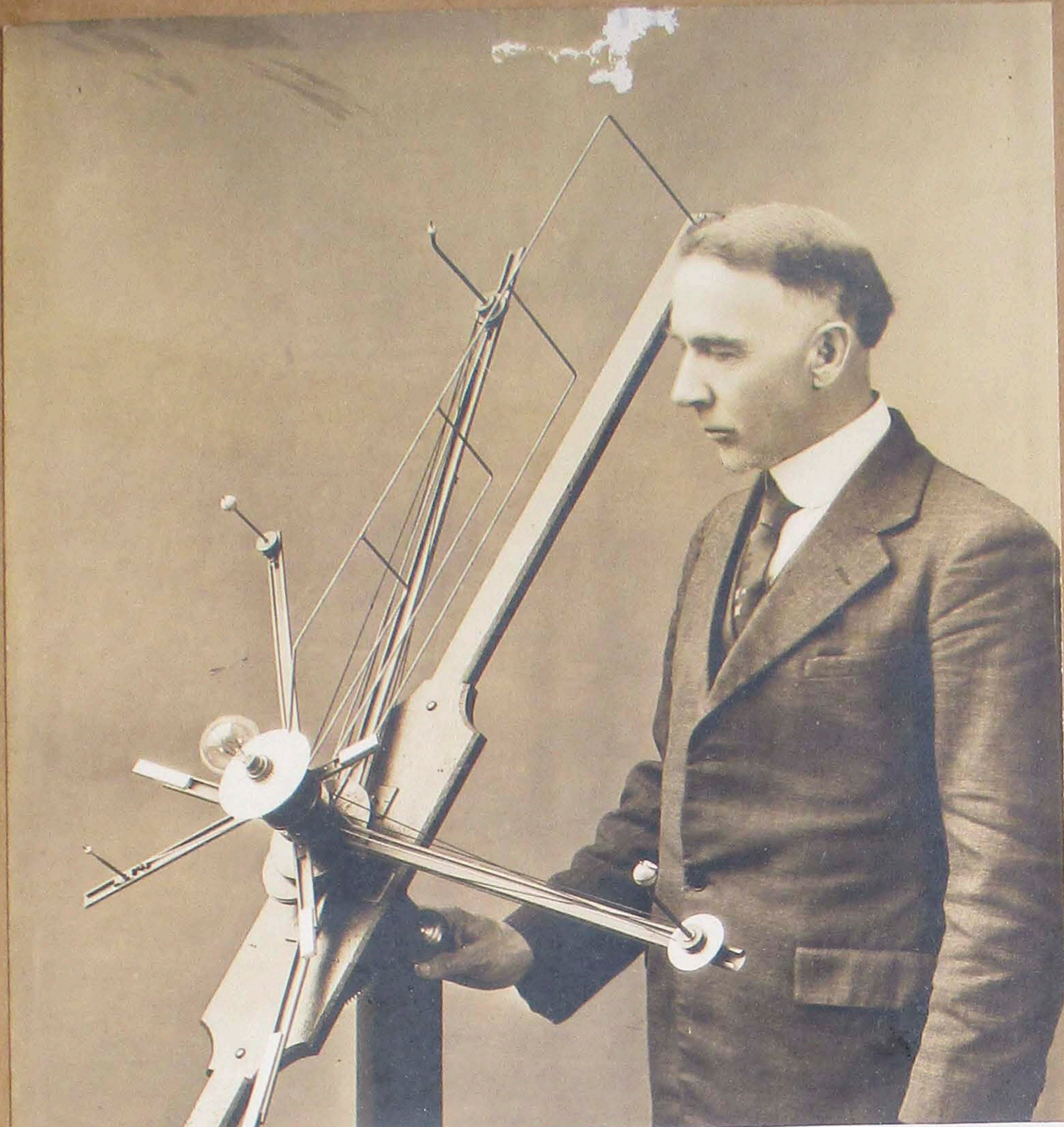
In the meantime other activities claimed some of my time. Whenever I felt weary of thinking or watching the spinning lathe I took time out to buil a toy, and the Victor Handcar, the Howitzer cannon, the Leaping Rabbit, the Baseball Game. ~~and~~ the Rocking Doll Carriage ~~are in the observatory~~. are in my den.

As time went on I wrote my book, "The Solar System", and later my booklet, "Some Solar System Data". Recently I published my new booklet, "Know Your Stars and together with Dr. Kingston produced the best star map in print and called, "The New-Way Star Map", of which we have sold thousands.

In 1942 I was awarded the Chant Medal of the Royal Astronomical Society of Canada for outstanding amateur work in Canada.

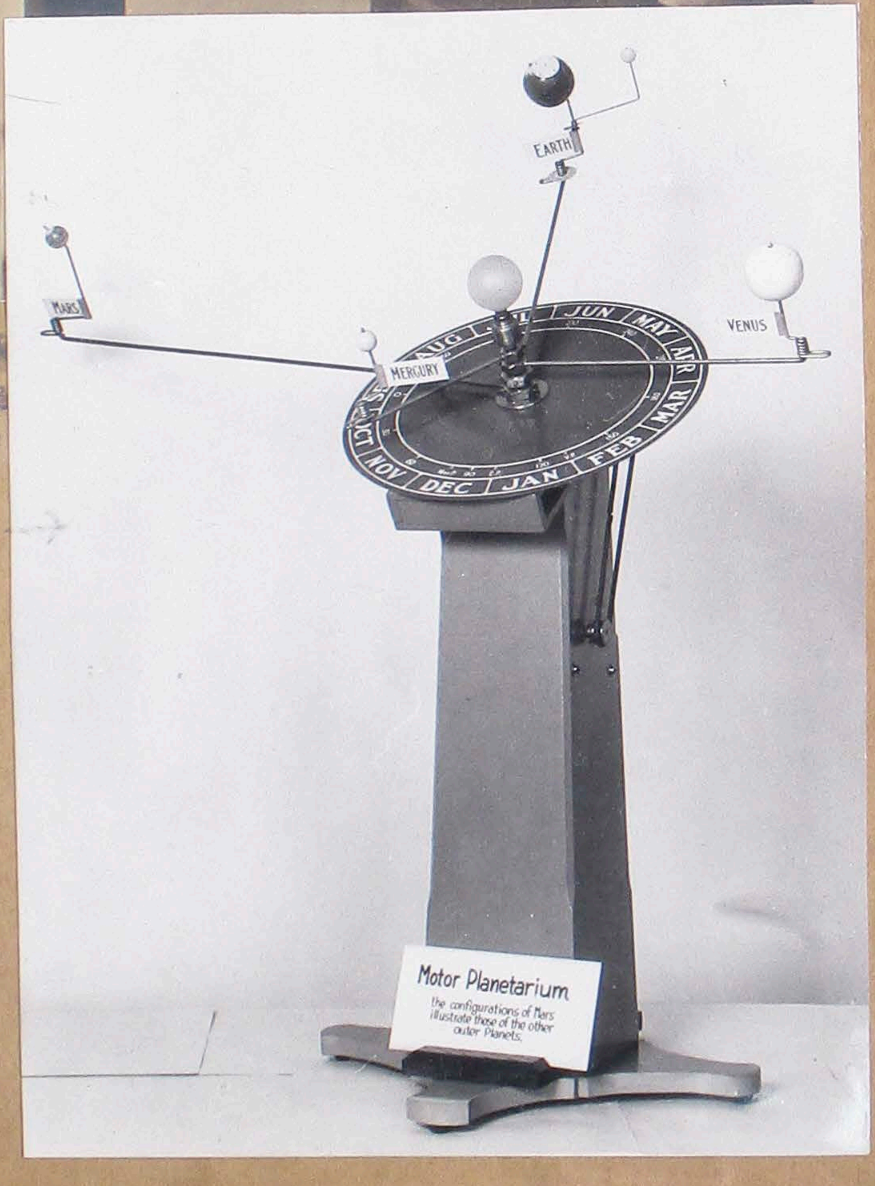
During these years of so-called retirement I have written many articles on astronomical subjects; published a critical pamphlet on Divine Healing, made a careful survey of the various cults in our city; drew up more than 300 changes in the theology, science and poetry of the United Church Hymnary, and made a poetic story of my life for my family. To add to all this I have writte many original poems of doubtful value, and now I am engaged in putting on a request performance-- the organization and instruction of The Sculptors' Guild of this city where we have one class for beginners, another for seniors and a th for those interested in Ceramics. The Guild, because of my retirement, has been taken over by the Technical School.

W.G.Colgrove, 2 Christie Str
London Ont.



The Original ~~Th~~
manual ~~now the~~
planetarium

Now remodeled
and made into the
Motor Planetariam


EARTH
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Motor Planetarium
the configurations of Mars illustrate those of the other outer Planets.

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A NEW SUN-EARTH-MOON MODEL

By W. G. Colgrove

A new model of the Sun-Earth-Moon System recently designed by the writer and built at the University of Western Ontario for its Department of Mathematics and Astronomy.

IN designing this mechanical instrument we were fully aware of the many attempts that had been made in this field to demonstrate the rather complex and difficult problems which are presented by the interrelations of the three bodies involved. Our experience in developing several other original aids to astronomical study made us rather careful about such matters as proportions and gear ratios, and our knowledge of some of the failures of other inventors made it necessary for us to refuse to follow in the beaten track. Many of their creations are unnecessarily involved and even fantastic, to say nothing of their frail construction, which renders them incapable of standing the rather vigorous handling of regular classroom demonstrations. It has been quite common practice to provide a hollow metal sphere for the sun instead of an electric light, so that even the seasons are not adequately shown, and seldom has anyone included the simple mechanism that produces the regression of the moon's nodes, which is so necessary to adequately demonstrate the recurrence of the phases of the moon and the repetition of the lunar and solar eclipses in the Metonic and Saros cycles.

In this instrument we present a unique combination of simplicity and ruggedness, together with compactness of design and comparative accuracy, only one approximate proportion being included, that of the diameters of the earth and the moon. We have learned that proportion is not essential and its absence is no handicap to the demonstrating value of the instrument. The problem of distances was solved by the limitations of portability and the space in one's car when conducting extension lectures with the instrument. The matter of diamaters of the three bodies was determined by size of the electric lamp and the requirements of classroom work. The complete model is 4 feet long, 2 feet wide

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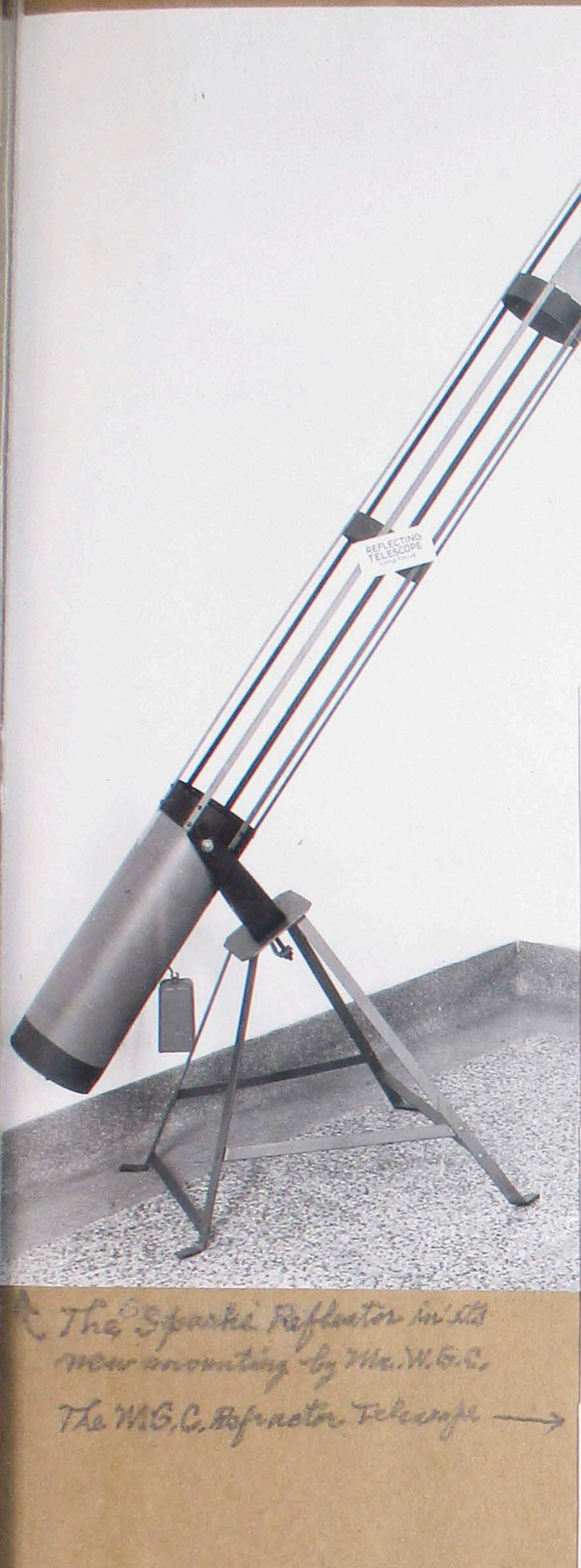
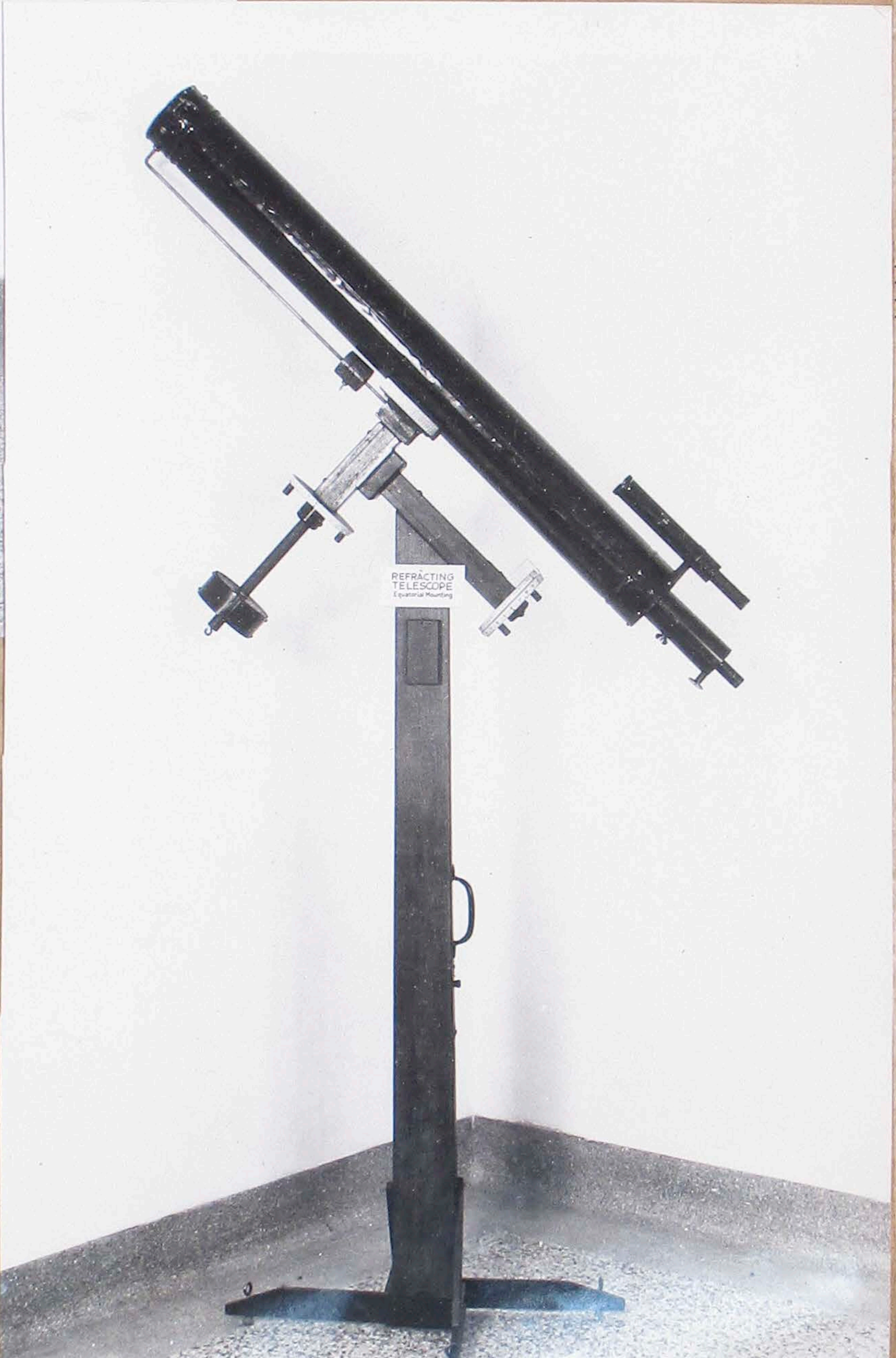


The "Sparks" Reflector in its
new mounting by Mr. W.G.C.

The W.G.C. Refractor Telescope →



London Scientists Put Universe In a Nutshell

◇ ◇ ◇

THE universe in a nutshell.

That in brief, is the task that two London scientists—Rev. W. G. Colgrove and Dr. H. R. Kingston—set themselves, when they commenced their labors in the workshop of the Hume Cronyn Memorial Observatory at the University of Western Ontario.

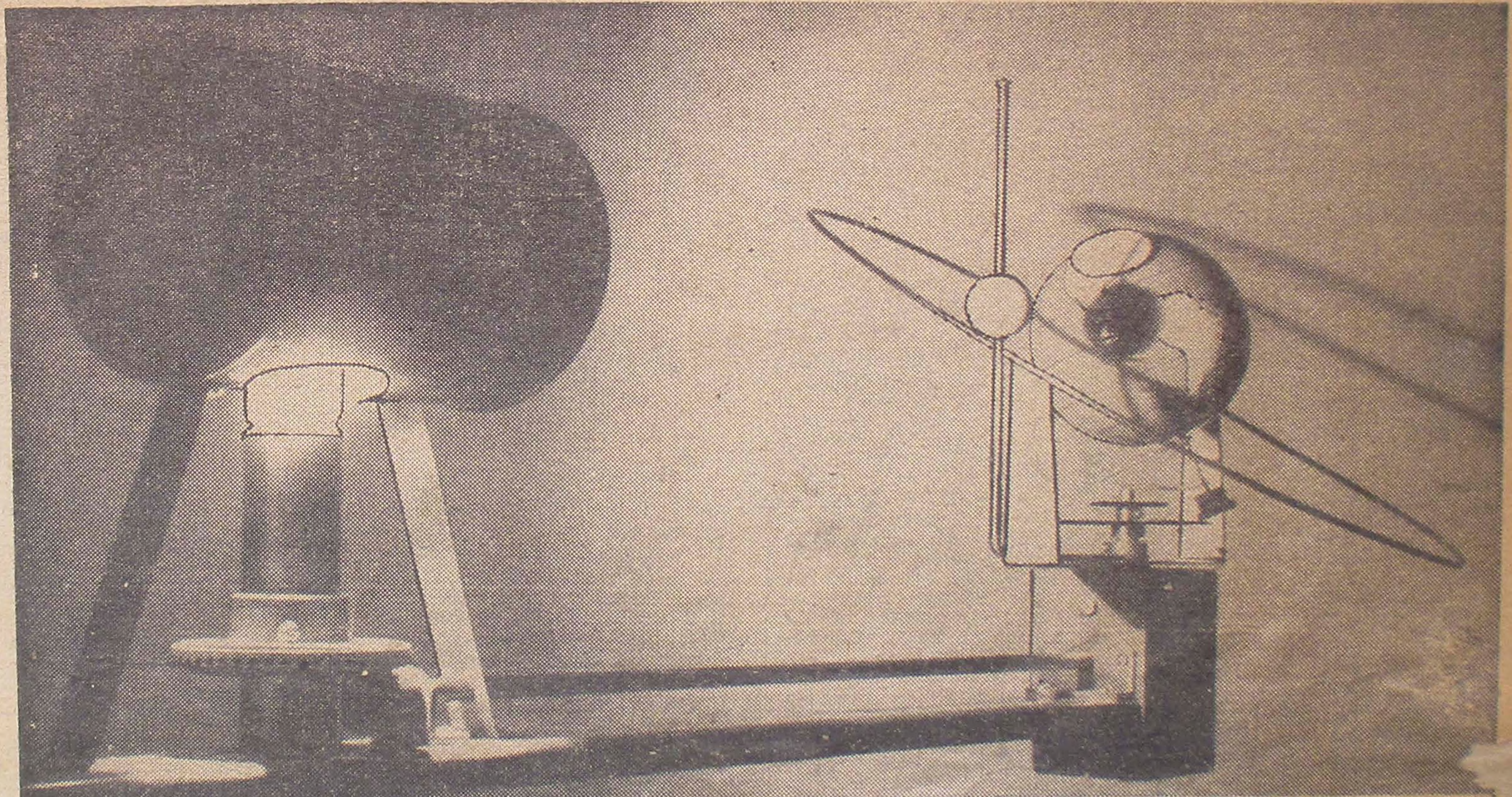
With bits of metal and cardboard, these two men retailored infinity in layman's language and succeeded in out-Jeansing Sir James Jeans.

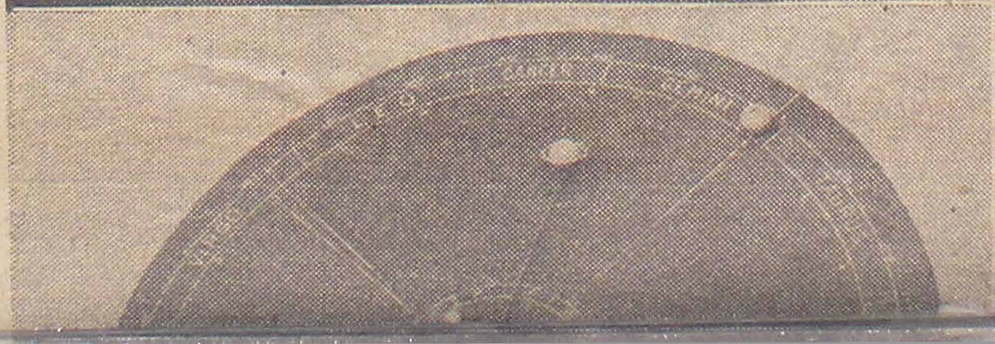
With models, maps and simplified instruments, they captured the essence of the celestial machine and reduced its complexities to the understandability of a Disney training cartoon.

Nation-wide recognition of the outstanding merits of the teaching equipment designed by London's two top "star-gazers" came this year when their instruments were exhibited at the annual meeting in Toronto of the Ontario Educational Association. Assembled teachers from all sections of the province took off figurative hats to the inventors. Eyes of astronomical instructors lit up when the simplicity of the instruments was demonstrated.

Now, the equipment which has been the pride of Londoners for several years is slated to be duplicated on a large scale wherever astronomical instruction is given.

The staggering immensities of space, the gigantic scale on which the celestial machine is constructed, make even the most fundamental astronomical concepts difficult to grasp. In a universe so vast that the mile unit of measurement becomes a mere 240,000th part of the distance separating the earth from its nearest neighbor and satellite, the moon; in a cosmos so colossal that spinning suns a billion times larger than the earth whirl ceaselessly at terrific speeds around





[illegible] loses touch with realities unless these eternal factors are mathematically reduced to simple terms.

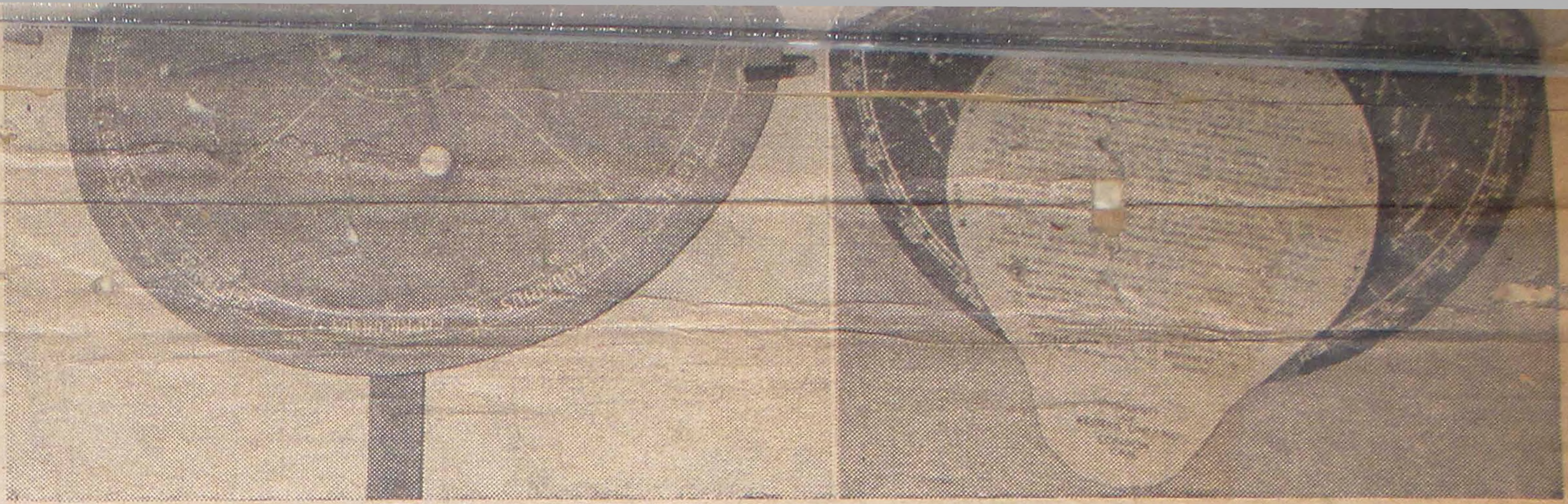
is is where the instruments sed by Mr. Colgrove and Dr. ston come in.

One of the most basic elements of astronomical knowledge, because it so nearly concerns us, and yet one of the most difficult to teach, is the cause for the seasons. This difficulty has been neatly and ingeniously overcome by the university inventors by the construction of an intriguing instrument known as a "Sotellunium." By means of accurately geared motors, models of the earth and moon are made to revolve in their respective orbits about the sun.

The tilting of the earth's axis, the seasonal approach and recession from the sun, are strikingly demonstrated. By illuminating the model sun with electric light, shadows can be produced on the earth model, duplicating both eclipses of the sun and moon. Several copies of this device are now in use in Ontario schools. The instrument is 40 inches long and 26 inches high, the earth appearing as a blobe four inches in diameter.

Once the student has advanced beyond this parochial earth-sun-moon "isolationism," he may progress, with the aid of the new instruments, to the study of a vaster celestial inter-relationship — that linking the members of the sun's family, the solar system. Two Colgrove Kingston devices aid him in understanding this sky machine, the Planetarium and the Planeto-Zodiac.

The "Manual Planetarium," three feet high, wired for electricity, bears scale models of the nine planets which comprise the solar system—Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune and Pluto—in order from the sun outwards. The nine models, mounted on wire arms, can be revolved in their respective orbits about the central luminary. Separate wooden models of the planets demonstrate the comparative sizes of the members of the sun's family, ranging upwards from the gigantic, banded Jupiter, which is shown as a globe five and a half inches in diameter. On this scale, the earth,



Above are shown three of the aids to the teaching of astronomy devised by two London scientists, Dr. H. R. Kingston, head of the department of mathematics and astronomy at the University of Western Ontario, and Rev. W. G. Colgrove, well-known local astronomer. TOP—A sun-moon-earth model, which illustrates in graphic manner the cause of eclipses of the sun and moon. An eclipse of the sun is demonstrated here. BOTTOM LEFT—The "Planet -Zodiac," an ingenious model illustrating the motions of the planets through the constellations in the skies above us. BOTTOM RIGHT—The most popular of the star aids developed for the education of students and interest laymen. This is the "New-Way Star Map," a great improvement on previous guides to the location of the stars, in that it permits greater ease in spotting the constellations. It can be held in the hand in a reading position and is so simple in operation that the inventors claim a child can use it.

which to us seems so huge, is a pigmy globe measuring a half-inch through the centre.

While the Planetarium exhibits the solar system as it might appear to some super-human observer millions of miles out in space, the Planeto-Zodiac demonstrates the complex motions of these close neighbors of ours in the skies above us. Equipped with a simulated horizon,. the planet models, set on wire arms, may be manipulated with this device to illustrate the daily motions of the sun and planets through the blue ocean above us, their rising and setting on our horizon.

Understanding of the solar family leads the student naturally to a desire to probe farther afield in the great sun-dotted sea of infinity beyond Pluto, watchdog of the solar system's outermost borders.

The multitude of stars which the shepherds of ancient Chaldee mapped in intricate sky patterns opens illimitable vistas to the student of the skies, but, once again, knowledge of the sky plan is difficult to impart without the use of some simplified instrument.

Here is where the most popular and most portable of the Colgrove-Kingston devices enters the picture.

Designed to aid the layman in finding his way through the maze of stellar constellations which patterns the night skies through the seasons, the "New-Way Star Map" makes the locating of any of the major stars as simple as spotting one's home on a street map of the City of London.

As every school child knows, the major stars are grouped in constellations, imaginary patterns in the sky of gods and goddesses, instruments of field, dwelling and chase, heritage of ancient stargazers.

The "New-Way Star Map" consists of charts of the northern and southern skies placed on either side of an eight-inch circular disk which may be rotated about an eyelet by which it is attached to a horizon card which also acts as a handle to the instrument.

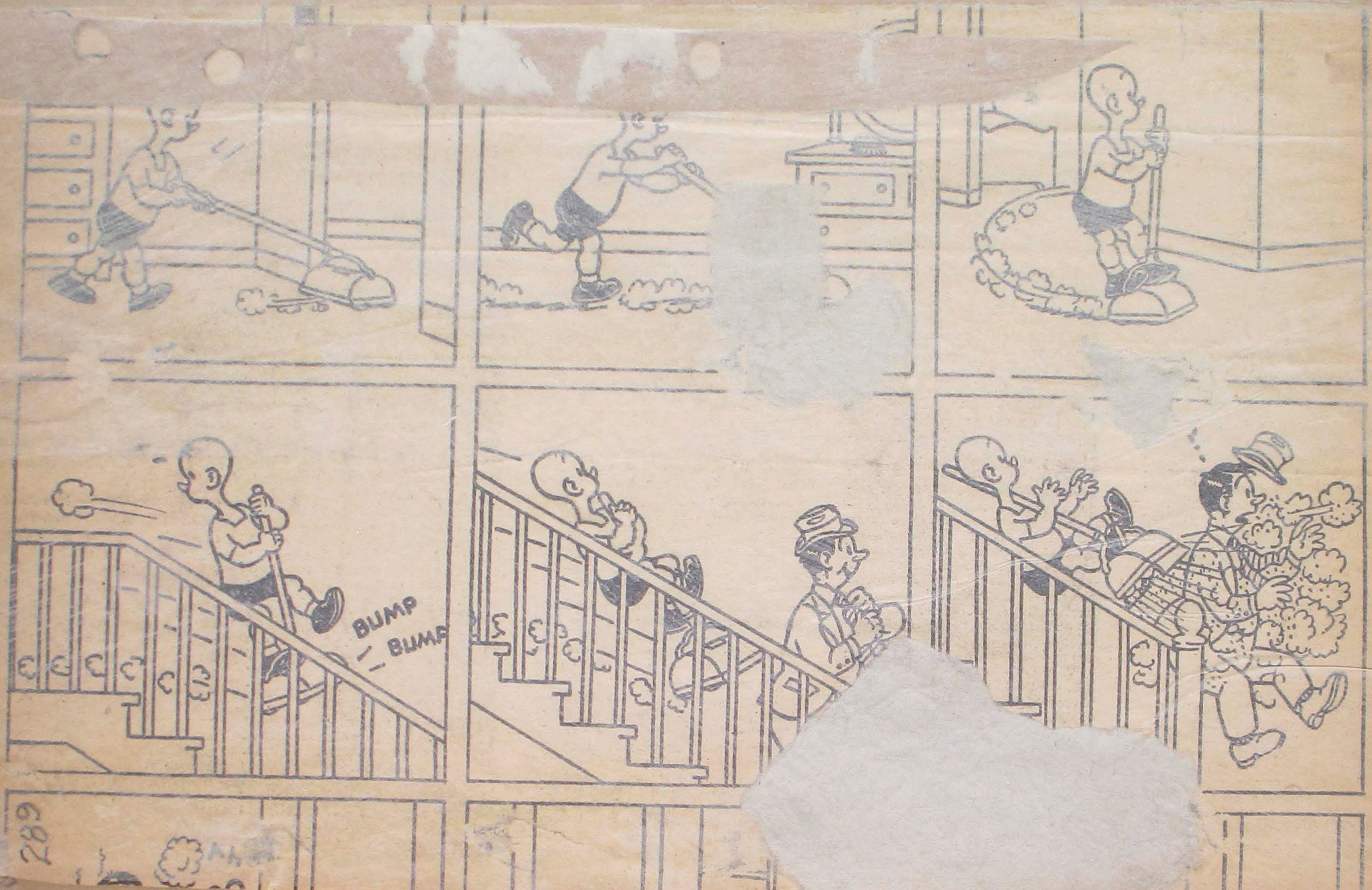
Star charts are nothing new; many of them have been invented, but the new feature in the Colgrove-Kingston map is that it is not necessary to hold the device over the head to obtain a picture of the skies, with subsequent strain on the neck and eyes. The chart is held in the hand in ordinary reading position, the disk is rotated and set up by current data as to time of the year, month and day. The result is an accurate representation of the northern or southern sky which serves to identify the heavenly bodies at a glance.

By dividing the sky into two hemispheric portions represented on opposite sides of the star chart, confusion prevailing in previous maps is avoided and a correct representation of accurate star movements across the sky is possible.

Accompanying the New-Way Star Map is a handy, simply written "Easy Pocket Star Guide for Beginners," written by Dr. Kingston, who is head of the department of astronomy at the university. This little book contains a planet table and other data, including maps of the skies in our latitude "facing north" and "facing south."

It would be difficult to overestimate the work done by Mr. Colgrove and Dr. Kingston in simplifying the teaching of what is one of the most fascinating studies of all, and one that can be enjoyed by any layman with the aid of these easily understood guides.

Citizens wishing to become more familiar with the mysteries of the universe in which we live are always welcome to attend the Hume Cronyn Memorial Observatory for the monthly "open house"—the first Saturday evening of each month, and there can see the remarkable instruments designed and built Colgrove and Dr. Kingst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KNOW
YOUR
STARS

A Ready Reference Hand
Book of 50 Constellations
and over 200 of the most
important stars

KNOW YOUR STARS

CONSTELLATIONS AND STARS

— By —

W. G. COLGROVE, M.A., B.D.,

Public Lecturer, Hume Cronyn Memorial Observatory, U.W.O.
Chant Medalist of the Royal Astronomical Society of Canada

2 Christie Street - London, Canada

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W. G. COLGROVE, M.A., B.D.
U. W. O.

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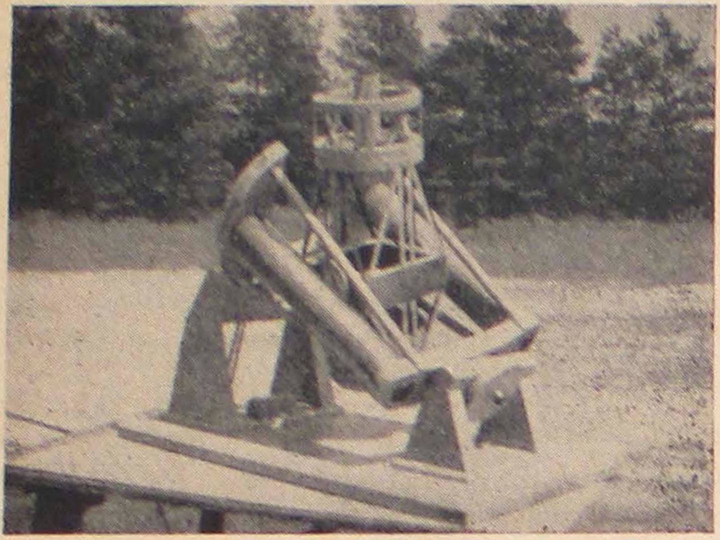
Poem: "Whither Bound"
Index of Constellations.
Index of Stars.

FRONTISPIECE

SCALE MODEL OF THE GREAT 200-INCH HALE TELESCOPE

Scale 1 - 40 Built by the writer



The great telescope has three main parts:— 1. Its foundation and piers made of reinforced concrete built around 23 thirty-foot steel pillars and the piers are crowned with a series of oil flotation bearings. 2. The unusual mounting with its two immense yokes 46 feet wide are held together by two huge tubular steel girders 10½ feet through and 55 feet long and weighs 350 tons. 3. The tube with its mirror at the bottom and its observer's cage at the top together with its instrumental equipment weighs 150 tons and is 56 feet long by 22 feet across The mirror alone is 24 inches thick, 17 feet across and weighs 14¾ tons. It was completed last year at a cost of over $6,000,000, and is housed in an observatory 135 feet high by 137 feet across and its dome weights 1,000 tons. It stands on Palomar Mountain one mile above sea level.

INTRODUCTION

In presenting this booklet about the stars as a companion to my "Solar System Data" may I say that this phase of astronomy is not difficult but thrilling, fascinating and exalting. A pencil flashlight will be useful.

The chapters preceding the map section will be greatly enjoyed as a large picture in that they portray in general terms some of the most modern and important astronomical facts and ideas.

The arrangement is simple, each map covers only 1/12 of the sky and reaches from the North celestial pole to the south horizon. To align it with the sky one needs only to hold the map up toward the south sky and observe the constellations which agree with it. In one year a careful student can become acquainted with the whole sky in our latitudes. Stars above the Zenith are north of the observer.

This information is up-to-date and dependable for hundreds of years. The reader, however, may find additional information from reliable sources which he may write in the blank spaces in the booklet. Do not be misled by wild statements which are sometimes found in Sunday papers.

Acknowledgment is hereby made to all authors whose works have been consulted and to other persons whose helpful suggestions have been used.

W. G. C.

CHAPTER I.

WHAT IS THE UNIVERSE?

At the very beginning of this article we wish to say that we are fully aware that no brief treatise can do justice to such a vast subject.

According to the lexicographers, who have succeeded in formulating many succinct definitions in rather general terms, the universe is Everything.

Some less careful writers suggest the word Creation as synonymous but a moment's consideration shows that it does not possess the all-inclusiveness necessary since there are many things that were not created but have developed since that occurred.

It might seem superfluous to add further comment but we all desire a more detailed statement about such matters as its origin, content, form, size, expansion and age. In discussing these we proceed with utmost caution.

ORIGIN—We shall not concern ourselves with the philosophy of physics in reference to the origin of the universe more than to say that the chief astronomers and mathematicians of our time have shifted completely from the mechanistic theory to one that recognizes the presence of a supernatural power whose base of operations is outside the complex creation. But when we say that, we are saying something which needs an explanation because that word Base seems to indicate a place that should be considered inside the pale of the universe. But if, as in Christian theology, we think of the operator as a supremely intelligent mathematician who exerts his power from himself as centre or base, we can and must consider him outside of his creation.

Professor Max Planck, in his book, "The Philosophy of Physics" said, "We have gone thus far but we cannot go on unless we post God." To this Sir James Jeans, Sir Arthur Eddington and even Professor Abert Einstein agree. Sir James, in his, "Mysterious Universe" more than a decade ago said, "The mechanistic idea has already shot its bolt and has failed dismally on both the scientific and philosophic sides".

The universe then is everything of mind, spirit and matter as commonly conceived existing and operating under the control of physico-mathematical laws through which runs the peculiar thread of indeterminism. Henceforth it is unlikely that Chance, in the form of Spencer's "fortuitous concourse of atoms," will ever try again to throw its dice since their loads have been extracted and exposed. Nor will evolution ever raise its head again as a final cause because, in the nature of the case and by its very name, it cannot have anything to do with the origin of anything but only with the thing's development. It was science that first suggested these ideas as working hypotheses, and it is science itself that has now ruled them off the board as unsatisfactory.

CONTENT—We have already said that the universe contains everything except its Creator. Now we shall list some of its more important constituents such as the atom with its various invisible parts whose dimensions are inconceivably small and proceed through chemical combinations and physical development to the plane where we see what we carelessly call The Real Thing which, however, must not be confused with philosophic reality.

No matter where we look we can see the evidence of creative energy, perhaps to many observers it is more clearly manifest in the night sky where we sense more fully the power, wisdom and glory of the offstage Creator and we feel something of the thrill which moved the Psalmist to say "The heavens declare the glory of God". It is not only the glory of its starry splendour but the greater glory of the transcendent intelligence of its Creator that appeals to us.

We see stars, multitudes of stars, vast oceans of stars, uncounted myriads of stars, stars of all kinds and sizes, some no larger than the earth and others billions of times as great. Stars of all colors, some so brilliant that they outshine our sun over half a million times. Stars with temperatures that rise from a few thousand degrees to unknown millions of degrees. Stars in colossal globular clusters, constellations of stars, streams of stars, millions of galaxies each with billions of stars and beyond all these, billions more that shine in the unplumbed regions of immeasurable space.

And that word Space connotates for us another intellectual nightmare but we cannot say it is empty since all the decillions of stars, seen and unseen, have shot it full of expended radiation for untold billions of years. Surely that has not become nothing or suffered annihilation and if not, it has become, by absorption, the constant food of the stars themselves along with their extensive supply of hydrogen and other gasses which also reside in space. It may be then that we have before our eyes a stupendous perpetual motion which will keep the universe and its stars forever in their pristine splendour. Besides all these there are the enormous volumes of cosmic dust and meteoric matter floating about almost everywhere.

This is the content in major detail, but for a thorough understanding of its numberless minor details we must refer our readers to the many volumes to be found on the Public Library shelves. But to completely grasp the vastness and the complexity of this universe one would have to study all the intangibles, the imponderables, the invisibles, the inconceivables and the so-called impossibles and continue his research until he has reached the point where, according to the colored preacher, he can unscrew the inscrutable.

FORM—Here we venture more cautiously because so little is actually known. Nevertheless, even in our Newtonian ignorance, let us take a few steps along the shore beside the sea. When we look about us there is so much that seems like the work of a geometrician that we are tempted to think the universe is a nicely planned structure. From another view it looks like a vast machine. From still other points it appears as an organism undergoing an age-long development. Dr. Jeans said it made him think of an enormous bubble, and Einstein feels that it shows signs of curving back on itself something like a gymnast who turns backward and crawls between his own legs. We are willing to let the mathematicians struggle on until they arrive at a consensus of opinion which we of the lower order can grasp.

EXPANSION—Again we tread on uncertain ground. One thing we do know, however, is that all the stars are moving from where they are at an average of about 12 miles per second. The sun, for example, is shooting through space at about 12½ miles per second thus it covers some 397,600,000 miles per year, and of necessity it is carrying the entire solar system with it so that the planets all revolve around the sun in helical paths. Now any person 50 years old will have travelled 50 times 397,000,000 miles or nearly 20 billion miles from where he was born in space, and in revolving around the sun with the earth he has added 309,000,000 miles per year which, in half a century, amounts to over 15 billion and makes a total of 35 billion miles to which must be added the rotation of the galaxy which at the position of the sun, is moving at 163 miles per second during that same 50 years. The grand total for this man is 313 billion miles.

When we look to the broader field of the known parts of the universe we discover that nearly all the galaxies are apparently receding from our position and this has been termed an expansion of the universe, and we might accept it as such but for the fact that a variety of different views are still held about it. With the great 200-inch reflecting telescope at Mount Palomar astronomers will look into space about a billion light years or 6,000,000,000,000,000,000,000 (six sextillion) miles, but no one thinks that he will see the edge or the circumference of the universe.

AGE—There are two schools interested in this problem; the one holds that the constant expenditure of radiation means final extinction or "Heat Death;" while the other claims to see the possibility of constant rejuvenation by some as yet unknown method which means a never ending creative activity which is much more in harmony with the Christian idea of an eternal self-revealing God. In either case the actual age of the universe is entirely beyond man's power to estimate.

CHAPTER II.

WHO INVENTED THE CONSTELLATIONS?

According to the most reliable historians the origin of the constellations lies beyond the range of man's knowledge, perhaps as far back as 100,000 B.C. Prehistoric man must have wondered about the stars for they were there when first he turned his eyes upward, and had been there for billions of years before he came upon the primeval scene.

Astronomy is probably the most ancient and fascinating of human studies and men, throughout all past generations, have tried to solve the mystery of its origin and sketch its development. If we carefully examine the available data it may be possible to find, at least, a partial answer to this age-old problem.

Some years ago a remarkable book by Dr. Joseph Seiss of Philadelphia came to our notice in which the naming of the original forty-eight constellations was discussed at great length. The author was able to show that their names and the names of their chief stars were invented by Hebrew star-gazers who lived before the Deluge, and that the earliest Arabian observers translated those names into the names we use today. He also claimed that the evidence was strengthened by the fact that no known historical scholar had discovered their inventors this side of the Flood.

We shall present some of his findings: He began with the Bible passage which says, "Let the stars be for signs" and reminded us that a sign is a rather ordinary thing arbitrarily chosen to represent some other thing of greater importance. For example, the letters of the alphabet are signs of sounds and numbers; musical notes are signs of the pitch and value of tones; Moses said that a swarm of flies was a sign to the Egyptians; Isaiah walked in his bare feet as a sign of the conquest of Egypt by the Assyians; each one signified something, outside of and beyond itself, which was of much greater importance.

The problem was, of what were the stars the signs, and the surprising answer was that they were signs of the Gospel story emblazoned across the sky for all ages and nations to read. And it is the duty of Christian people to understand and explain them, because modern Astrology, which is a corruption of ancient Astrology, has degraded this whole field of divine revelation to unchristian and ignoble ends.

The author then quoted statements from several eminent scholars including Ingemann of Denmark who felt sure that the

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constellations possessed a divine purpose and significance; and Albumazer, the Arabian historian, who said that the constellations were known all over the world from the beginning; and Cicero who quoted the Greek writer Aratus as saying that the signs are measured out to express divine wisdom; and Roberts, in his discussions with Volney, accepted as a truth that the stars refer to the promised Messiah and his defeat of the great satanic serpent; and Dubuis, for his "Origin of the Cultus", collected a vast number of traditions of all nations that mention a divine person whose task it was to destroy the serpent and that this person and his work were reflected in the stars; and to these he then added the names of certain classical and theological savants like Dr. Adam Clarke, English biblical commentator; Dr. William Smith, classical examiner of London University; Dr. Archibald Sayce, famous English philologist; and Dr. Stanley Faber, well known English author and preacher, all of whose writings contain revealing references to this very unusual subject, and he summed up their remarks in the Bible passage in Psalm 19 which says, "The heavens declare the glory of God."

That glory, he claimed, was not the wonderful magnificence of the starry sky, but rather the remarkable munificence of the Creator in providing a way of escape for man from sin and its penalties. And may we add a further note on Psalm 19 where it says that the stars have no voice, but maintains that their instruction and meaning are broadcast to all the earth. In other words they are there to appeal to the uplifted eyes of men.

And, as if that were not enough, the writer carefully summarized the well considered statements of still other scholars of highest repute to the effect that the age of the constelations must be sought in prehistoric times; that they were old when man first learned to write about them, and no one knows how distant is the period of their invention.

Dr. Gustav Seyffarth, German Egyptologist, said the people of the Nile valley knew them 2780 years before our era, and the Orientals used them 3447 years before Christ.

Professor Riccioli, Italian astronomer, said that some Arabian records show that the constellations are as old as the time of Adam. Dr. Bailly, French astronomer, said that this ancient science must have had its beginnings at least 4,000 years ago. Professor Mitchell, American biblical critic, declared that we must go back beyond the Deluge for their inventors.

Origen, Alexandrian theologian, maintained that it was asserted in the Book of Enoch, mentioned by Jude in the New Testament, that in the time of that patriarch the constellations were already named and divided. And finally, Josephus, the Jewish historian, affirmed that the starry lore had its origin with the antediluvian patriarchs Seth and Enoch.

We thus discover that neither the Greeks nor the Romans, nor even the most ancient Egyptians nor the older Babylonians had anything to do with the invention or arrangement of the original forty-eight constellations. They merely took what came to hand and made whatever changes suited their pagan mythologies. Much of it was completely beyond their knowledge of the very ancient languages and their comprehension of the divine revelation involved, so that when they undertook to make their pagan additions or subtractions they made some ridiculous blunders to which we refer in our monthly star-map chapters.

If this remarkable thesis is true we are face to face with one of the most wonderful cases of divinely inspired revelation known to humanity. Perhaps the great sky book, is, after all, God's first redemptive move and was made thus so that the Gospel truth might never be erased from man's view. Edward Young, in his poem "Night Thoughts" says,

> "This prospect vast, what is it?
>   Rightly weighed,
> 'Tis Nature's system of divinity;
> 'Tis Elder Scripture, writ by God's own hand:
> Scripture authentic, uncorrupt by man."

CHAPTER III.

WHAT DO STAR NAMES MEAN?

In Chapter II. we discussed the invention of the constellations and what, in general terms, was their significance. In this, all too brief summary of only one third of the Zodiac, we shall remind our readers once more of the almost incredible fact that the names of the 12 zodiacal constellations as well as the names of their 36 related groups and chief stars show a definite connotation which connects them with the redemptive purpose of the Creator as understood by man.

It appears that the progressive self-revelation of God was and is three-fold: The first phase which is also the most recent, is the remarkable story of Jesus Christ as told in the New Testament; the second intermediate phase was the development of the Hebrew Scriptures as found in the Old Testament; while the third and most ancient phase was the starry sky whose frescoes are so full of divine meaning.

These three phases are all closely linked together in their representation of the most important facts and events in the life, death and resurrection of Jesus; the growth, persecution and final triumph of the Church; and the resurrection, judgment and consummation of the heavenly kingdom.

Reliable historians tell us that thousands of years before the so-called ancient Greeks appeared, the Arabs, who then lived in the southern part of the Arabian peninsula roamed the hill country of Palestine and were able to understand the very ancient Hebrew stories about the formation of the constellations. They translated the star names with great care because they sensed their pecular significance. The early Greeks who were polytheists could not fathom these monotheist's traditions, and, on that account, made many blunders in translation.

When we go back to such early ages and study the effect of time on the positions of the constellations we discover that at some very distant but definite point in time the Zodiac began with Virgo. This is shown on various ancient zodiacs.

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The first constellation of the Zodiac was Virgo which in all languages means the Virgin and naturally forms the initial step in the momentous story of the Gospel. Here then begins the stellar revelation of the Divine purpose and plan for the redemption of mankind, and amazing as it may seem, this Virgin of the sky holds in her right hand the star Alazal which means the

Branch or Christ. In her left hand is the brilliant blue star Spica which means a Head of Wheat and represents the seed of the woman who, according to Scripture, is to bruise the serpent's head.

The first group related to Virgo is Coma, not Koma as the Greeks supposed. Coma does not mean hair but it does mean the Desired One and the pictures on several ancient zodiacs portray a mother with a baby in arms. The second related group is Bootes which means the Coming Shepherd whose brightest star Arcturus means the Keeper of the Flock, while the star Katurops in his right hand means Rod or Branch and thus refers to Christ. The third related group is Centaurus which is below our horizon and means the Destroyer of Disease. He is the good, wise healer of the ills of mankind, but on account of man's sin, he was despised and rejected and finally hanged on the cross.

* * *

The second zodiacal constellation was Libra the Scales which have always been the symbol of justice and are here used to weigh the price of sin. The brightest star is Zuben Genubi which means the Price Deficient—man, the second bright star is Zuben Shemali which means the Price Sufficient—Christ, and the third star Algubi means heaped up high.

The first group related to Libra is Crux which means Cross and lies far below our horizon. It always signifies sacrifice or cutting off in death. The second related group is Lupus the Wolf which was slain by the Centaur and represents Jesus who was put to death without protest, that is, he allowed himself to be nailed to the cross. The third related group is Corona the Northern Crown which represents the reward of eternal glory bestowed on Jesus for his vicarious suffering and ignominious death.

* * *

The third constellation of the Zodiac was Scorpius, the dread Scorpion in conflict with Ophiuchus, the Serpent Holder or restrainer of evil in the world. He stands with one foot on the monster's back and the other on its tail which, nevertheless, is able to inflict a very painful and fatal wound in his heel.

The first related group then is Ophiuchus which holds a long serpent in his hands to prevent it from seizing the Crown toward which it is straining.

The second related group is this serpent which has been captured and is being held for judgment and perdition.

The third related group is Hercules which is a fair Roman translation of the Greek Heracles which, however, is a poor translation of the ancient Arabic which meant, not a Greek hero,

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but the Coming One whose head is marked by Rasal Gethi one of the largest stars known and means the head of the Bruiser of the serpent. The star in his right arm means the Kneeling Branch which refers again to his wounded heel, but his other foot rests on the head of the Dragon far up in the northern sky to which we shall refer below.

* * *

The fourth zodiacal constellation was Sagittarius the Archer, a double natured creature in the Greek myth which was made half horse and half man. This fairly represents the ancient idea and indicates the God man nature of Christ. His arrows are aimed at the heart of the Scorpion because his special task was to destroy the works of the devil.

The first related group is Lyra the Lyre which was the musical instrument of unbounded joy over victory. The brightest star Vega means He shall be exalted in triumph.

The second related group is Draco the Dragon mentioned above, which Hercules will finally destroy. Its name also means the Trodden on, and Thuban its chief star has two names; Al Dib which means reptile, and Al Waid meaning the one to be destroyed.

The third related group is Ara the burning altar which in Arabic is Al Mugamra and means the one completely destroyed. It therefore represents the final victory of Jesus and the total destruction of all his enemies.

We have now seen the ancient meanings of the names of what were the first four constellations of the Zodiac together with their related groups and chief stars. It is a matter of great surprise to find that the birth, life, sufferings, death and victory of Jesus Christ are depicted in the sky, but there they are.

CHAPTER IV.

FACT AND FICTION IN ASTRONOMY

In this rather unusual article we suggest that it is time to cease teaching the mere appearance of astronomical phenomena and put greater emphasis on their basic known facts. That would be better psychology and easier astronomy. We do not include the fiction of ancient mythology because it is a definite aid to memory.

We think that too much is said about the rising and setting of the heavenly bodies, because they have never done either and therefore the soft pedal should be used on these merely apparent motions. Teachers should stress the fact of the rotation of the earth on its axis from west to east as the real motion and point out that we are carried around by the earth so that we can see all the constellations in our latitude if we observe the stars for 24 hours. When we are turned toward them and our horizon plane dips below them, we say they are rising, when our meridian passes them, we say they culminate, and when we are leaving them behind, we say they are setting. The constant use of the terms rise, culmination and set which are only apparent, is confusing to the students.

Another inexcusable error occurs when it is said that the sun passes through the 12 constellations of the zodiac each year, since it does not do so because they are too far away. The truth is that we are riding around the sun and, during the year, we see the near-by sun projected in front of a distant constellation each month.

* * *

It is often remarked that the sun makes its trip around the sky at about one degree per day, but this is not so. It is the earth that makes the trip which is its annual revolution around the sun, which is in the plane, not on the circle of the ecliptic.

Some seem to think that since the sun is the primary cause of the weather, it also causes the seasons, but this is only partly true. It should be made clear that we could not have seasons without the sun, but it is the revolution of the earth around the sun, together with the angle of the earth's equator that accounts for the four seasons. There would be but one season were the earth not tilted.

Another widespread mistake is that the moon is the cause of our weather and this goes uncorrected by the teacher who has never taken the trouble to find out the proper answer. Today it is known that there is no scientific reason for holding that outworn notion. The best counter to that fable is to point out that since the earth rotates on its axis each 24 hours, the moon would cause similar weather all around the earth each day, which is not so.

It is incorrect to say that any member of the solar system is in a specified constellation since that cannot be so. The fact is that the sun is only 93 million miles away while the nearest star is over 25 trillion miles distant. We should simply say that the body is in front of the constellation.

* * *

It is also incorrect to say that a body is stationary in its orbit at any time or that it performs a retrograde motion for certain periods. It is almost silly to even suggest that such fast-flying bodies can stop at specified points in their orbits to say nothing of backing up for days or months at a time. When one speaks of that which is only apparent he should always state it as such. The repetition will help greatly to produce clarity in the mind of a student.

Another source of trouble is in the so-called diurnal circles of the sun which are only apparent because the sun does not rise nor set. It is the earth again with its rotation, its angles of inclination and the orientation of our horizon plane which makes the heavenly bodies appear to rise at different points on the eastern horizon, culminate at different heights on the meridian, and set at different points on the western horizon. The sun is not to blame.

A lesser fallacy is often expressed at the time of a solar eclipse when it is said that the moon's black disk slides across the sun's bright disk. But neither of these bodies has that shape and they are always more than 90 millions of miles apart.

But the worst fiction of all is the one which pictures the planets revolving in flat eliptical orbits around a fixed sun, when no such arrangement exists. The fact is that the sun is moving at high speed through space and the planets have to keep abreast with it. This causes the planets to cover enormous helical paths which makes it necessary for them to travel much farther and faster than we have been told. Pluto, for example, moves more than four times as fast and goes more than four times as far as it could with a stationary sun. It is similar with respect to the other planets. This motion of the solar system, however, does not alter the arrangement of the stars appreciably in a dozen life times.

Another failure to be explicit occurs when we talk of the eccentricity of a planet's orbit, when it is the sun that is out of centre. Each orbit has its own centre and when the sun is not there it is eccentric, not the orbit.

Why continue to call attention to the so-called wobble of the ecliptic above and below the celestial equator when that does not happen in nature but only when one spins a celestial globe?

Why should anyone speak of the changing orientation of the Milky Way as another wobble when that does not happen either? The rotation of the earth makes it appear overhead at one time and almost parallel to the horizon at another, but it does not wobble.

Why do some still speak of the stars as fixed when it is common knowedge that they are moving in all directions?

* * *

Why mention the signs of the zodiac when they have so little to do with astronomy? It is better to say constellations of the zodiac and remember that they do not occupy equal spaces as do the signs.

Why tell folks that the stars rise about four minutes earlier each night when in reality they all remain trillions of miles away, while we rush around to see them at 18½ miles per second?

Why do some still call meteors falling stars when that false name is based on momentary appearance only and they have nothing whatever to do with stars?

Why continue the ancient jingle about the zodiacal constellations which begins with, "The Ram, the Bull and the heavenly Twins," when we know that the vernal equinox is no longer in the Ram but has slowly moved about 30 degrees over into Pisces and the jingle should be as follows:—

"The Fish and the Ram and the bright-eyed Bull,
The Twins and the Crab and the Lion cruel,
The Virgin, the Scales and the Scorpion,
The Archer, the Goat and the Waterman."

CHAPTER V.

METHODS OF STAR MEASUREMENT

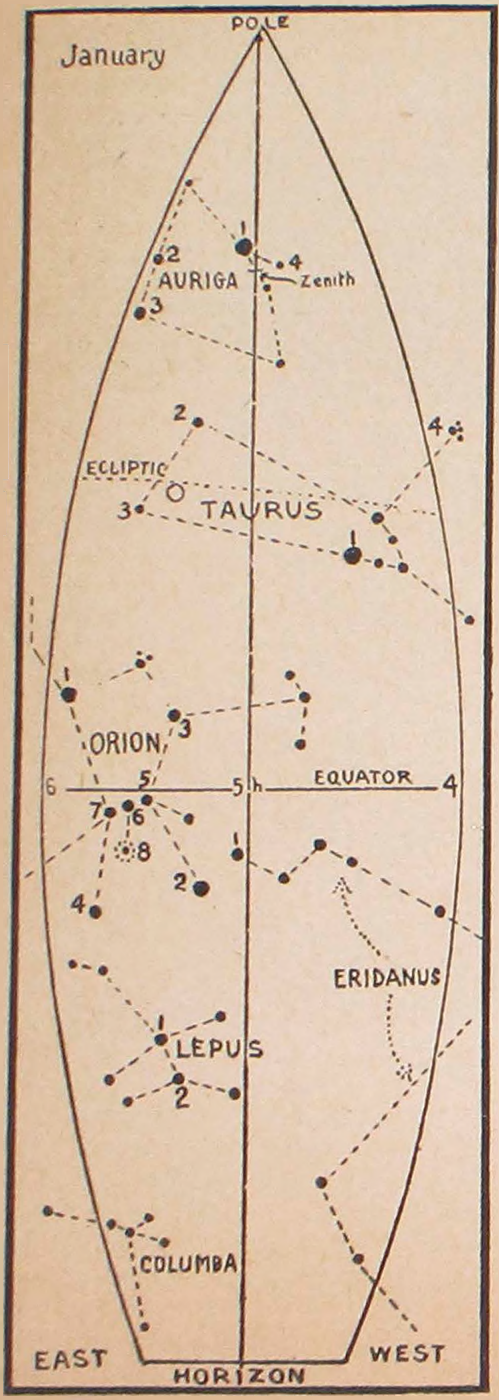
DISTANCE—For purposes of popular description we have to think of the sky as space scattered with stars whose distances from us and from one another are very great and vary greatly. To determine the distance of the nearest stars one may use the ordinary surveyer's method with the diameter of the earth's orbit as a base line and the result would be called the heliocentric parallax from which the distance in miles can be computed. Greater distances are determined by means of photometric measurements of the light variation of certain stars called variables which may be seen almost anywhere in the sky as well as within the vastly distant stellar nebulea. This is called the Period-luminosity relation according to which the longer the period the greater the apparent brilliance of the star. From this relation the distance can be computed.

DIMENSIONS—Only a few hundred star diameters have been obtained because of their great distance and the refinement of the procedure employed. The largest instrument used in this operation is the fifty-foot interferometer attached to the 100-inch Hale telescope at Mount Wilson in which small mirrors set at right angles cause twin beams from the same star to form fringes which interfere and make it possible to compute the star's diameter in miles. The most recent results will be found in the twelve chapters which follow. It woud be interesting to assemble the diameters given and place them side by side on a convenient scale to see their relative lengths. When the diameter is known it is an easy matter to determine the circumference, area and volume of the star.

MOTIONS—Stars have a variety of motions, some only apparent, others real. Their real motions are axial, proper, radial, group and galactic, and these are measured by the spectroscope which also indicates their speeds whether in the line of sight approaching or receding or across the sky. These interesting matters are dealt with in the chapters which follow along with the revolutional velocities of several binary stars.

CHARACTERISTICS — Light, magnitude, temperature, color, kind and spectral class are all determined by instruments such as the telescope, the spectroscope, the photometer, the thermocouple and a variety of other aids which demand technical knowledge, operational skill and careful statistical methods.

THE SUN OUR NEAREST STAR—By the most painstaking computations it has been recently decided that the average distance of the sun is 93,000,000 miles, its diameter 864,000 miles, its weight nearly 2,000,000,000,000,000,000,000,000,000 (2 octillion tons), its light per second 3 octillion candle power, its energy 500 sextillion horse power of which the earth receives only 230 trillion horse power, its surface temperature 10,500 degrees F., its period of rotation at the equator about 25 days, its gravity 28 times that of the earth, its volume 1,300,000 times greater than the earth and its density only ¼ that of the earth. The question is often asked, "What makes the stars shine?" and the best answer to date is that the enormous heat of the sun causes hydrogen gas to change into helium gas with a by-product of radiation we call light. It is estimated that the sun absorbs 564,000,000 tons of hydrogen each second and converts it into 560,000,000 tons of helium and, during that process, produces 4,000,000 tons of light. This, of course is amazing but is probably a close approximation to the truth.



CHAPTER VI.

THE JANUARY STARS

The first constellation is AURIGA (long i with accent) the Charioteer, but we cannot find the chariot nor the horses. In ancient myth pictures this driver is shown with a Mother Goat on his shoulder and two little kids in his hands as though he had just rescued them from the awful bull nearby.

The No. 1 star is Capella, which means the Mother Goat just mentioned. It is of first magnitude, is 42 light years away, has a diameter 16 times that of our sun and a brilliance 150 times as great. It is a physical double star or binary system which revolves around its common centre of gravity in 104 days. They are 50 million miles apart and receding at 18 miles per second.

No. 2 is Menkalinan, a variable star of second magnitude and 63 light years away. It is approaching at 11 miles per second.

No. 3 is Theta, a double star of magnitudes 2½ and 7. They are 112 light years distant and receding at 20 miles per second.

No. 4 is N. Headi the upper kid star and a variable which changes its brightness from magnitude 3½ to 4 in 27.14 years. It is 543 light years distant and is approaching at about 2½ miles per second.

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The second constellation is TAURUS (all vowels short) the Great Bull with its horns lowered in a charging attitude, in old mythology this animal represented Jupiter because it is said that he fell in love with the goddess Europa and bore her away on his back to the island Crete.

No. 1 is Aldebaran (all vowels short, accent on e) the double Bull's Eye. It is 53 light years distant and has a diameter 35 times that of our sun but its temperature is only half as great while its brightness equals 91 suns. It is one of the Hyades group, sometimes called the Wild Geese, and is receding at 43 miles per second. It has a faint companion of magnitude 11.

No. 2 is El Nath the tip of its upper horn. It is distant 116 light years, is of second magnitude and is receding at 3½ miles per second.

No. 3 is Zeta the tip of its lower horn. It is 326 light years away, is of third magnitude and is receding at 9½ miles per second.

No. 4 is Alcyone (y long with accent, long o and e) the chief sister of the Pleiades (ei like long e, short a long e). It is of third magnitude, is 233 light years away and is receding at 6 miles per second. At one time it was supposed to be the centre of the universe. The group over which it presides has long been called the 7 daughters of Atlas, one of whom fell in love with a human and has not been seen since. Just above No. 3 but 10,000 light years back in space, is the famous Crab Nebula, a faint oval gaseous body with an irregular fringe all around it. See small circle.

* * *

The third constellation is ORION (accent on long i) the mighty Hunter who is about to attack the charging Bull. He faces us and has a club raised high in his right hand and a lion's skin for a shield in his left. His head is marked by a small group of faint stars while the main stars are much brighter;

No. 1 is Betelgeuse (beteljuz, first e short, with accent, long u). It is one of the largest stars known and is a reddish pulsating giant of first magnitude with a diameter 400 times that of our sun. It is 300 light years away, has a temperature like Aldebaran and a brilliance 2,000 times that of our sun, but is receding at 16 miles per second.

No. 2 is Rigel (ri-jel, long i with accent) one of the most brilliant stars known and said to be 15,000 times as bright as our sun. It is another first magnitude star 543 light years away and bluish in color. It is 40 times the sun's diameter and recedes at 13 miles per second.

No. 3 is Bellatrix (long a with accent) another first magnitude star 217 light years distant and receding at 10 miles per second.

No. 4 is Saiph (safe) a second magnitude star 543 light years away and receding at 12 miles per second.

Nos. 5, 6 and 7 are the Three Kings which form the Hunter's glittering belt. They are all of second magnitude. 5 is Mentaka, 466 light years away and receding at about 12 miles per second. 6 is Alnilam, 407 light years distant and receding at 16 miles per second. 7 is Alnitah, 296 light years away and receding at 11 miles per second.

No. 8 is the great greenish, gaseous Nebula 500 light years away surrounding the sword and partly hiding the four faint stars which form the Trapezium. The very famous Dark Bay nebula, sometimes called the Horsehead lies between us and No. 8 at a little over half the distance.

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The fourth constellation is ERIDANUS (all vowels short, accent on i) the Royal River which meanders in a long winding stream through two maps down to its mouth where its chief star Achernar (first a long) awaits it far below our horizon. Its source is Cursa, just above Rigel, of third magnitude, 59 light years distant and coming at 4 miles per second.

* * *

The fifth constellation is LEPUS (long e with accent) the Hare whose No. 1 star is Arneb which means Mad Hare. It is reported in the myths that its depredations caused Orion to trample it to death. It is 272 light years distant, is a double of magnitudes 4 and 9½ and is receding at 14 miles per second.

No. 2 is Beta another double star at a distance of 181 light years with magnitudes 3 and 9½ and coming at 8 miles per second.

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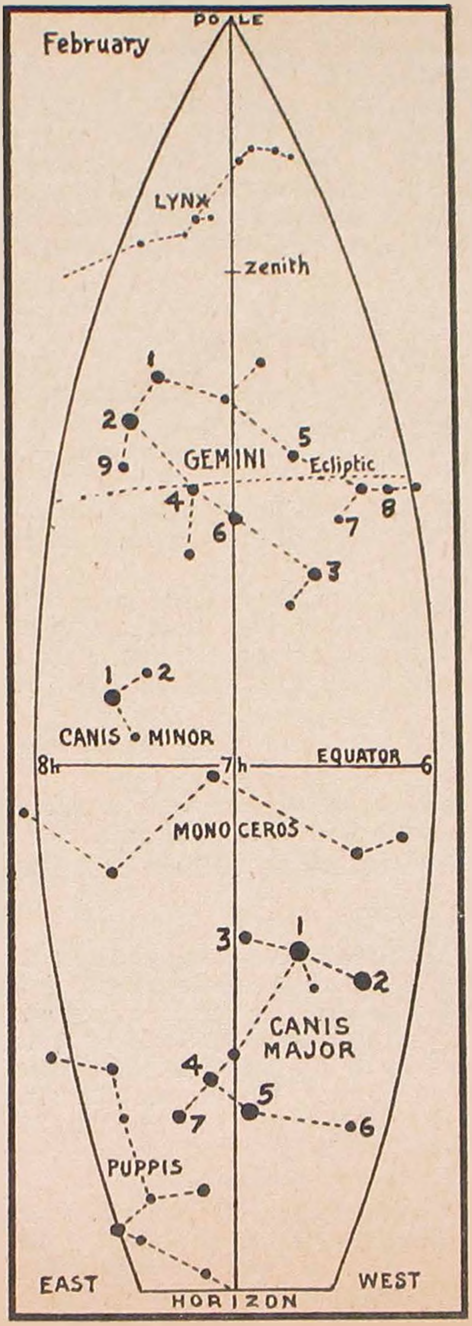
The sixth constellation is COLUMBA (all vowels short, accent on u) the Dove whose stars are few and faint and difficult to see in the horizon haze.



CHAPTER VII.

THE FEBRUARY STARS

The February map contains a fair dispay of bright stars, one of them being Sirius, the most brilliant star in the entire sky.

The first constellation is LYNX, the Wild Cat, composed of a loose chain of faint stars which lie diagonally across this and the next map, but has nothing to attract our attention since there are so many brighter ones to interest us.

* * *

The second constellation is GEMINI (last "i" long) the Twins which in Greek mythology, were supposed to be males, Castor and Pullux, two sons of Jupiter, who on account of their prowess in battle and their affection for each other, placed them side by side in the sky. In one ancient zodiac they are of both sexes and called Adam and Eve, but this does not seem to be convincing.

No. 1 is Castor the Hero, sometimes called Apollo, which is a very close group of six stars in three pairs. To the naked eye it appears as a first magnitude star but the telescope reveals it as not only a twin with Pollux but it is twins in its own right and each is twins and a binary system. One pair revolves in three days, the other in nine, and the fainter pair has another small double star revolving around them. The average distance of this group is about 44 light years and their combined light equals 37 of our suns.

No. 2 is Pollux the Ruler or Judge which the Egyptians called the Son of the Sun and Hor which means the Coming Judge while the Babylonians named it Merodach the Restorer. It is of first magnitude, is 31 light years distant and receding at 2 miles per second. It is 30 times as bright as our sun which shines with 3,000,000,000,000,000,000,000,000,000 (3 octillion candle power) believe it or not.

No. 3 is Alhena which, in Arabic means hurt or wounded in the foot. It is of second magnitude, is 65 light years away and is approaching at 6½ miles per second.

No. 4 is Wesat which means the judgment is set. It is a yellow and red double of magnitudes 3 and 8 and marks the position near which the new planet, Pluto, was discovered by Clyde Tombaugh in 1930.

No. 5 is Mebsuta a white and blue double of magnitudes 3 and 9½. It is 362 light years distant and is receding at 6 miles per second.

No. 6 is Mekbuda a yellow short-period variable star that changes its brightness from magnitude 3½ to 4½. It is 652 light years away and receding at 4 miles per second. It has a blue companion of magnitude 7 and they make a fine picture in the telescope.

No. 7 is Nu which is situated near the place where the planet Uranus was discovered by Sir W. Herschel in 1781.

No. 8 is Eta above and to the right of which is a fine naked eye cluster M 35 and a planetary nebula with a central star.

No. 9 is Kappa which is said to be a beautiful blue and gold double of magnitudes 3½ and 8.

* * *

The third constellation is CANIS MINOR (long a short i, long i short o) the Lesser Dog which covers a rather small area and boasts only one bright star. No. 1 is Procyon (accent on long first o) which means the precursor of the big dog. It is of first magnitude, is about 10 light years away and double. It shines with 6 times as much light as our sun and is 50 per cent larger, but it is only one fifth as dense. Its companion revolves in 39 years. The name Procyon is evidently a greek error for the old Egyptians called it Sebak which means the Victorious one.

No. 2 is Al Gomeiza which means the Burden released. It is of third magnitude, is 148 light years away and is receding at 13 miles per second. The Greek blunder here is apparent when one looks at the map because this so-called dog does not preceed the big dog but follows it by rising almost one hour later. The Romans copied the Greeks and called it the little dog.

* * *

The fourth constellation is MONOCEROS (all vowels short, accent on middle o) the Unicorn which is a modern group with no important stars.

* * *

The fifth constellation is CANIS MAJOR (long a short i, long a short o) the Greater Dog which is supposed to belong to the hunter Orion.

No. 1 is Sirius the so-called Dog Star because it seemed to have some hidden connection with the Nile. It is the brightest star in the sky because it is so much nearer than most of the other stars. Its distance is about 9 light years or only about 50 trillion miles. It is of magnitude — 1.6 or brighter than first magnitude and shines with 40 times our sun's light. Its diameter is only twice that of our sun so that it is not very large as stars go but it is coming toward us at 4½ miles per second. The name Sirius has nothing to do with dogs and in Arabic means the Appointed Prince, and this is shown in the names of the other stars as we shall soon see. It has a small heavy companion whose diameter is 30,000 miles (similar to the planet Uranus) but its mass is equal to that of the sun which in weight is nearly 2 octillion tons (2 with 27 zeros). Its density is 10,000 times that of the earth so that if a cubic inch of it were brought here it would weigh a ton. It revolves around Sirius in 49 years at a distance of nearly 2 billion miles but at present it is too near that star to be seen.

No. 2 is Mirzam the Ruler which is of magnitude 2 at a distance of 233 light years and receding at 20 miles per second.

No. 3 is Muliphen the Leader or Chief and of fourth magnitude.

No. 4 is Wezen the Illustrious of second magnitude, 543 light years away and also receding at 20 miles per second.

No. 5 is Adhara the Glorious, a double of magnitudes 1½ and 8 some 326 light years distant and receding at 16 miles per second. Another unmarked is Al Haḇor which means the Mighty one.

No. 6 is Furud a third magnitude star 251 light years away and receding at 19 miles per second.

No. 7 is Aludra of magnitude 2½, 272 light years distant and receding at 24 miles per second.

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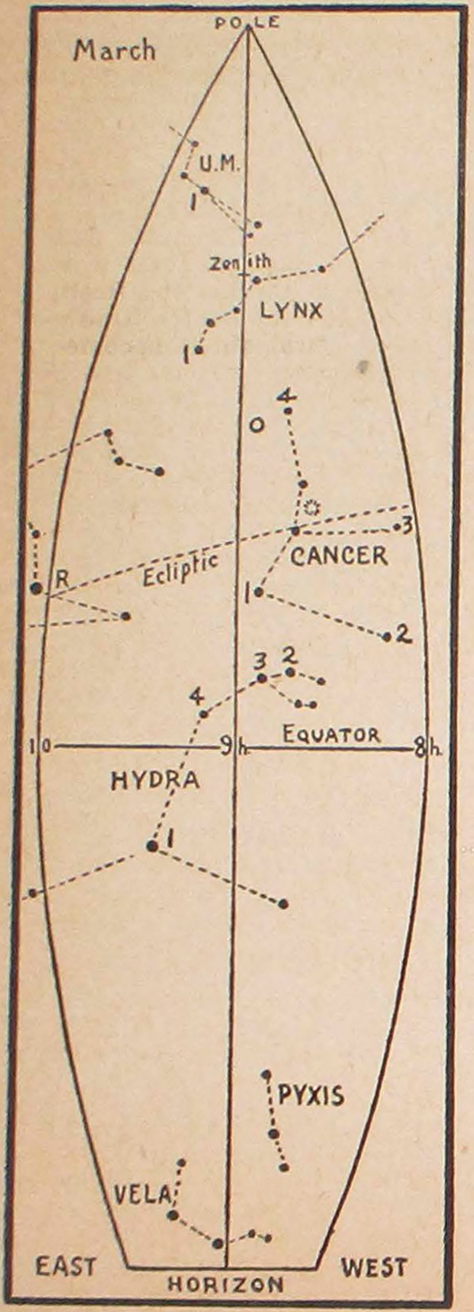
The sixth constellation is PUPPIS (vowels short) the stern of the ship Argo, the mythical vessel used by the Argonauts when in search of the Golden Fleece. There are no bright stars above the horizon haze.



CHAPTER VIII.

THE MARCH STARS

This month's map covers a rather poor area of the sky. The bright stars are few in number and Cancer is the only complete constellation on view.

The first group is a small part of the constellation URSA MAJOR the so-called Greater Bear. It is a piece of one foreleg with two toes and we shall see more of it in our next map. To identify this, and all other stars above the zenith, just hold the map upside down with its back to the north and the meridian in line with Polaris.

Next month we shall see that this is an odd kind of bear in that it has only two toes on each foot and a long tail which no bear ever has. It cannot be a bear.

No. 1 is Theta of magnitude 3, 45 light years away and receding at 10 miles per second.

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The second group is the eastern half of the constellation LYNX the Wild Cat, the western half of which we saw in the February map. This is a modern constellation and has very little of interest.

No. 1 which is Alpha the only bright star in the whole crooked line of mediocre stars. It is of third magnitude, is 148 light years distant and receding at about 23 miles per second. Even if the rest are faint it is good practice to identify them.

* * *

The third group is the constellation CANCER the Crab which is a zodiacal member and well known because of the presence of the famous open cluster of over 300 stars called Praecepe (ae as long e other es long). In ancient times it was known as the Manger but today it is usually termed the Beehive and is marked by a small circle of dots near the centre. One can see it with the naked eye but with fair optical aid it becomes a beautiful bevy of silver and golden brilliants at an average distance of 400 light years.

The meaning of Cancer, as found in Hindoo, Parsi and Chinese zodiacs by Dr. Seiss, is Rest Secured and comes from Khan a resting place, and cer an enclosure. The Egyptians called it Klaria which means resting places. The meaning of Praecepe, as found in the Hebrew and Arabic languages, is the Multitude which refers to lambs. Besides this cluster there are a few interesting stars.

No. 1 is Acubeus which means Sheltered rest. It is of fourth magnitude, is 100 light years away and coming at 8 miles per second.

No. 2 is Beta of magnitude 3½, at a distance of 217 light years and receding at 13 miles per second.

No. 3 is Zeta which is a close group of three fifth magnitude stars with a probable fourth faint one which is thought to be the cause of the peculiar antics of the third star. Two of the three form a binary system which revolves in 60 years, while the third seems to wobble around the unseen companion in a period of 18 years, and now the two pairs are revolving around each other in about 600 years.

No. 4 is Iota a fine orange and blue double star of magnitudes 4½ and 6½.

The R to the left indicates Regulus in Leo but we shall not discuss it until next month when we shall have the whole constellation before us.

* * *

The fourth group is a part of the very long constellation HYDRA (long y) the Great Water Snake or Serpent which reaches across a third of the sky. The name Hydra, in Arabic, means the thing abhorred and, according to many writers, refers to the snakey tempter of Eve in the garden of Eden. The Greeks changed its reference to that of a mythical monster which was said to infest the Lernaean Lake and which possessed 100 heads, one of which was immortal and finally found its place among the constellations. The destruction of this monster was assigned to Hercules who, after several attempts, succeeded by cauterizing each neck from which he severed the hissing head.

Here we see the one head that was immortal, now shining with several jewels and at its heart a gleaming diamond.

No. 1 is Alphard which means the one who has been put out of the way by death. It is orange in color and of second magnitude, is 181 light years away and approaching at 2 miles per second. It has a distant, greenish companion of the tenth magnitude

No. 2 is Epsilon the glittering eye of this serpent which is a fine yellow and blue double star. We can see the yellow one which is of fourth magnitude, is 272 light years distant and coming at 22 miles per second. The blue one requires a telescope, and they form a binary system which revolves in about 15 years.

No. 3 is Zeta of magnitude 3½, 125 light years away and receding at 14 miles per second.

No. 4 is Theta which is an interesting double of magnitudes five and eleven.

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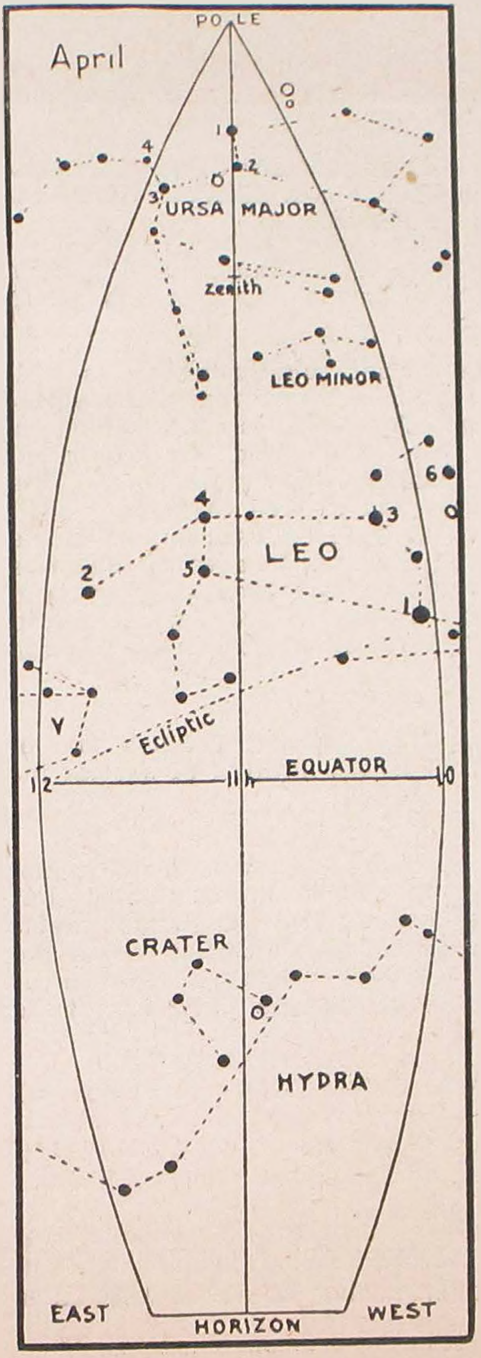
The fifth group is part of the small constellation PYXIS (short y and i) the Mariner's Compass. It is a scattered group of faint stars of which we have shown only the needle pivoted on the middle star which is Alpha. It is of magnitude 3½, is 466 light years distant and receding at 10 miles per second.

* * *

The sixth group is part of the constellation VELA (long e) the sails of the ship Argo mentioned in our February map article. It is too low in the horizon haze for good seeing.



CHAPTER IX.

THE APRIL STARS

Beginning at the top we are to study the well-known and easily recognized constellation URSA MAJOR (short u, a and long a) the Greater Bear whose tail reaches into the May map and is a curious appendage for a bear. Indeed, in very ancient times, before the Greeks made many silly changes to suit their mythological fancy, these so-called bears were known to the Egyptians, Persians and Indians as the greater and the lesser sheepfolds. This puts the long tail where it belongs, on a sheep and satisfies the etymology of the most ancient names of the stars as we shall soon see.

In the Greater Bear or rather Sheepfold, the part called the Dipper is most important because it contains the best known stars and these have names which refer to sheep.

No. 1 is Du'bhe (short u with accent, long e) which means fold or herd. It is a second magnitude star 9.1 light years away and coming toward the earth at about 5 miles per second.

No. 2 is Merak (long e with accent, short a) which means flock. It also is of second magnitude, 72 light years distant and is coming at about 7½ miles per second.

No. 3 is Phecda (short e with accent) which means the lambs. It too is of second magnitude, is 93 light years away and coming at about 7 miles per second.

No. 4 is Megrez (long e with accent, short e) whose meaning is not given. It is of third magnitude, is 65 light years distant and coming at about 7½ miles per second.

We shall not describe the stars of the handle now because they belong to the May map. You will remember that Nos. 1 and 2 are the pointers to Polaris (long a).

Just above the so-called bear's neck one, using optical aid, can see the two spiral nebulae, one of which resembles a flywheel with its hub toward us, the other with its edge toward us. Another remarkable nebula just beneath the Big Dipper is called the Skull or Owl nebula since it has two dark spots in it. There are several nebulae and clusters in and around the dipper bowl but all need optical aid. One can easily see the three legs of the bear, each with two toes, just like a sheep. In several countries there are different names for the dipper; the wagon, the plow, and the oxen but these all arise from the Greek errors which began when they mistook dub for dob. The former means fold while the latter means bear. See No. 1 above.

* * *

The second constellation is LEO MINOR (long e and o, long i short o) the Lesser Lion but it has nothing of special interest for us this month.

* * *

The third constellation is LEO the Lion which, of course, should be called the greater lion but somehow has missed that honor. It is an outstanding constellation and an important member of the zodiacal band. In the ancient languages Leo meant the one that rends or destroys and indicates that the fierceness of his anger seemed to flash like fire from his eyes as he sought his prey.

No. 1 is Regulus (short e with accent, long u and short u) from Regel which means the feet that crush. It is a first magnitude star 71 light years away and receding slowly at only 1½ miles per second. It is as brilliant as 70 of our suns combined.

No. 2 is Denebola (both e's short, accent on second one, long o) and means little tail. It is a second magnitude star 39 light years distant and slowly approaching at about 1½ miles per second.

No. 3 is Algieba (ie as long e with accent) the Superior One. It is a beautiful double star of second magnitude 136 light years away, revolving in 407 years and approaching the earth at about 22 miles per second.

No. 4 is Zogma (short o with accent) the Brilliant One. It is a second magnitude star only 56 light years distant and approaching at about 14 miles per second.

No. 5 is Chort, a third magnitude star 130 light years away and receding at about 4½ miles per second.

No. 6 is Rasal Asad, a third magnitude star 362 light years distant and receding from us at about 3 miles per second. A short distance below No. 6 is a spindle-shaped nebula and just west of Regulus there is a wonderful red double variable star which revolves in about 144 days. Both of these objects need optical aid, so do the scores of nebulae that are scattered about this constellation.

* * *

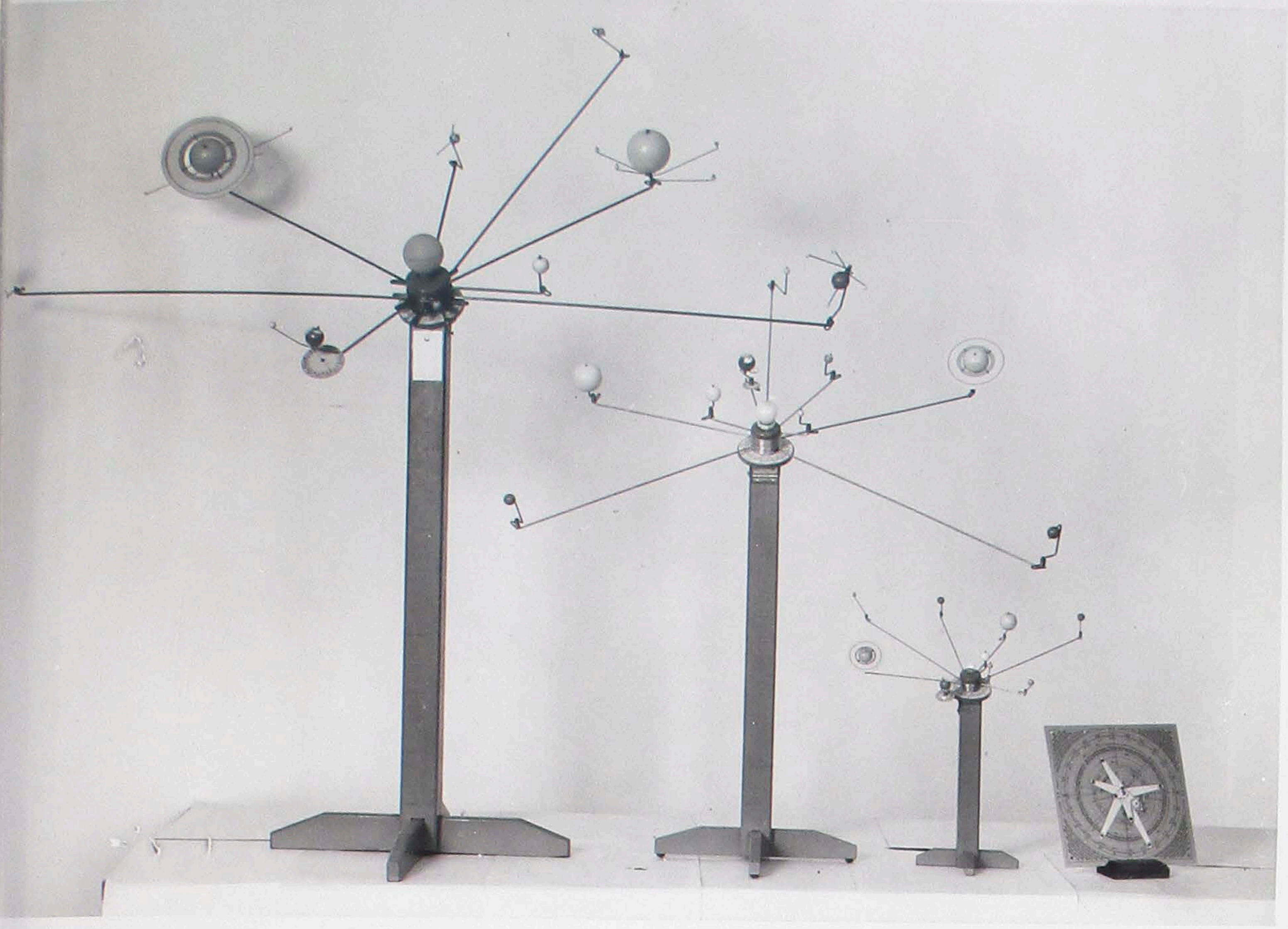
The fourth group marked V is the head of the constellation VIRGO so we shall leave it until next month.

* * *

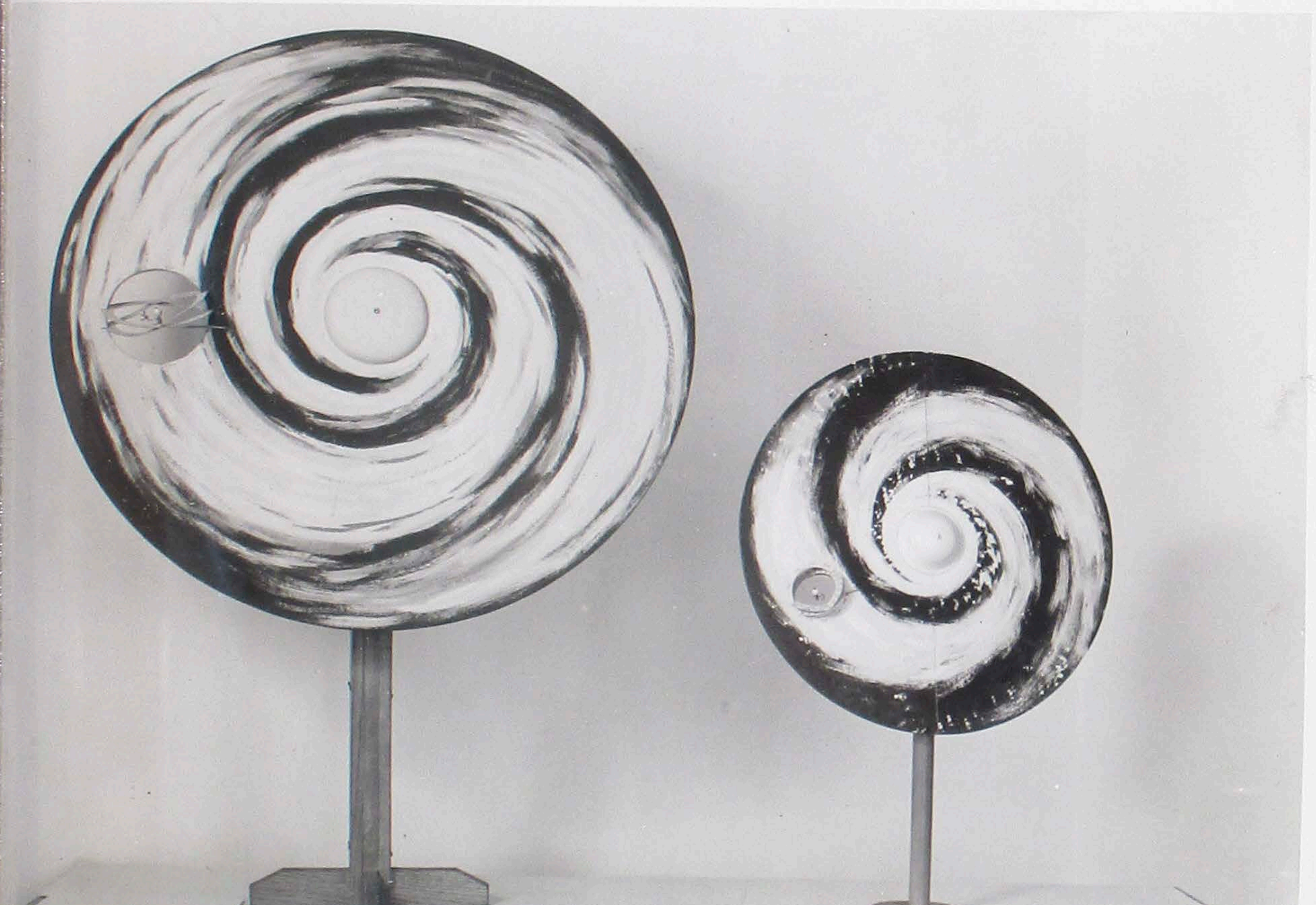
The fifth constellation is CRATER (long a short e) the Cup which is pouring its contents upon the great water-snake Hydra. Just inside the cup's edge is another remarkable red double variable star similar to the one mentioned above.

* * *

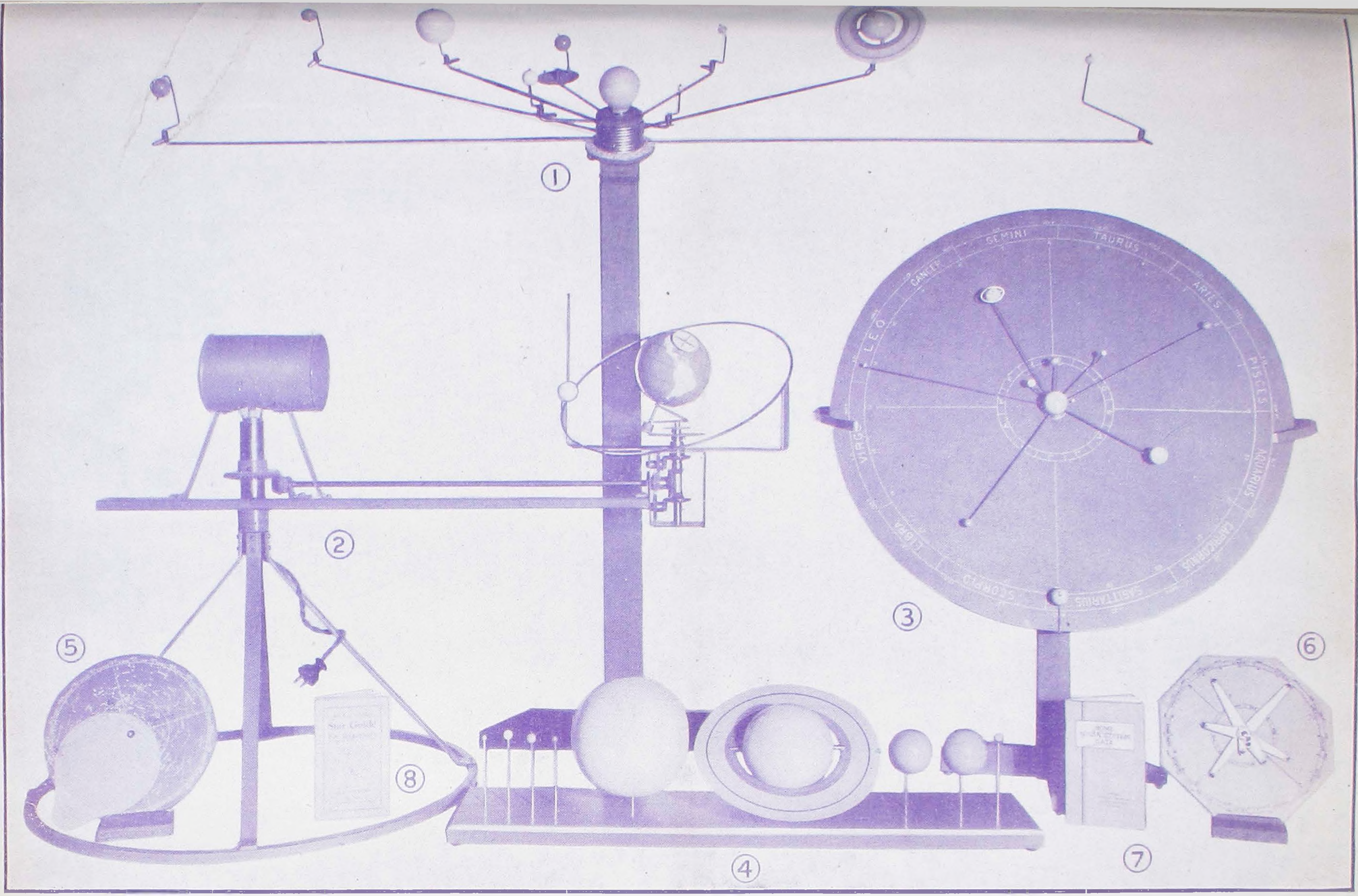
The sixth group is an unimportant part of Hydra.



PLANETARIA FAMILY



GALAXY



(1) Manual Planetarium.
(2) Sotellunium.
(3) Planeto-Zodiac.
(4) Models of Planets.
(5) New-Way Star Map.
(6) Simplex Planet Placer.
(7) Solar System Data.
(8) An Easy Pocket Star Guide.

(OVER)

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THE STANDARD, MONTREAL, FEB.. 19, 1949.

Noiseless Piano

By RON KENYON

Rev. W. G. Colgrove, public lecturer at the University of Western Ontario, London, Ont., expects to have a fight on his hand when word gets around in the world of music about his new idea — playing music in color instead of sound.

The 77-year-old inventor has invented what he called a "prismatic piano" to back up his theory.

The "piano" is soundless. When a note is struck a light throws a beam of color on to a screen or curtain. "Music" is composed of combinations of colors created by striking a single note or combination of notes. When a tune is played you get a kaleidoscopic succession of colors, but no sound at all.

Piano Company Interested

The idea sounds screwy, but Colgrove says a big piano manufacturing company is already dickering for rights to produce his invention commercially.

"In this modern world of speed, why dawdle along with mere sound in our culture?" asks Colgrove.

Not that he would have music replacing sound. "It would form a valuable and long overdue expression of man's love of beauty in color," says Colgrove.

The inventor claims that when people get used to it, they'll recognize "tunes in color" just as easily as they now recognize music in sound. People whose senses don't appreciate the glories of a clear C will thrill to the purity of blue, green and night-sky purple.

Colgrove, who has a number of other inventions to his credit says he has no wish to make money. He invents because he enjoys it.

The principle of the prismatic piano has a definite basis in science, says Colgrove.

Musical notes vibrate in the atmosphere almost exactly a thrillion times slower than corresponding colors. Colgrove paired up notes with colors and built the prismatic piano, which omits the sound entirely and makes use solely of the color corresponding to the sound.

C Is Yellow

For instance, C above middle C, which vibrates 522 times a second, is represented by the color yellow, which vibrates 590 trillion times a second.

When you strike C above middle C on an ordinary piano, 522 vibrations a second tremble out of the piano into the air of the room like ripples on a pool of water. Your ear is sensitive to these vibrations. It picks them up and relays them to the brain.

On the prismatic piano, striking the same note produces the light beam of 590 trillion vibrations a second. Your eye relays these vibrations to your brain.

Blue vibrates at 700 trillion times a second. On the prismatic piano it represents the note E, which vibrates 675 times a second. Violet, 800 trillion times a second, represents G, 795 times a second.

Colgrove sees a lot of uses for his piano, apart from teaching university students the relationship between sound and light, for which it was actually desighed.

In public entertainment, it could be used in "silent dancing," the rhythm being supplied by regular recurrence of one color among a sequence of colors. The color music would be flashed on the floor, walls and ceiling.

Colgrove envisages "color music" on ceilings of public auditoriums, large domed buildings bathed in color music at night and composers juggling swing hits out of the spectrum.

Answers Musicians

To musicians who assert that music is music and not color, Colgrove replies that just as certain musical sounds produce passion, relaxation, or grate discordantly on the mind, his color music can be made to have definite effects on the observer. Green is the color for those who desire rest, red for raising the pulse and blue for coolness and thought. It may be found that sombre greys and browns bring depression and yellows raise the seer to the pure heights of Valhalla, he claims.

So far, the prismatic piano has been built only for experimental purposes. It consists of a single octave above which is a small screen where the colors are reproduced.

Later, the whole piano keyboard will be utilized and powerful beams will illuminate entire stages and auditoriums.

Alternatively, the piano can be so designed that it produces both sound, music, and color music. So you can't lose, says Colgrove.

Invention is only a sideline to Colgrove. He always wanted to be a cleric. He put himself through McGill University working as a lithographer in Montreal. Later he took an MA at the University of Western Ontario and BD at Boston University.

He was pastor in the episcopal methodist church in and around Boston, was the architect for the Convenant Methodist Church at Worcester, Mass., and held charges in the United Church of Canada in many western Ontario towns, among them Wallaceburg and Strathroy.

Following the Second World War he made mechanical toys for use in occupational therapy of disabled veterans, and now he is head of a school of sculpture, another sideline.

His specialty is the making of astronomical instruments for teaching purposes. He has reconstructed the universe in at least 20 instruments, replicas of which are sought eagerly by other universities.

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7. For further information address Dr. H
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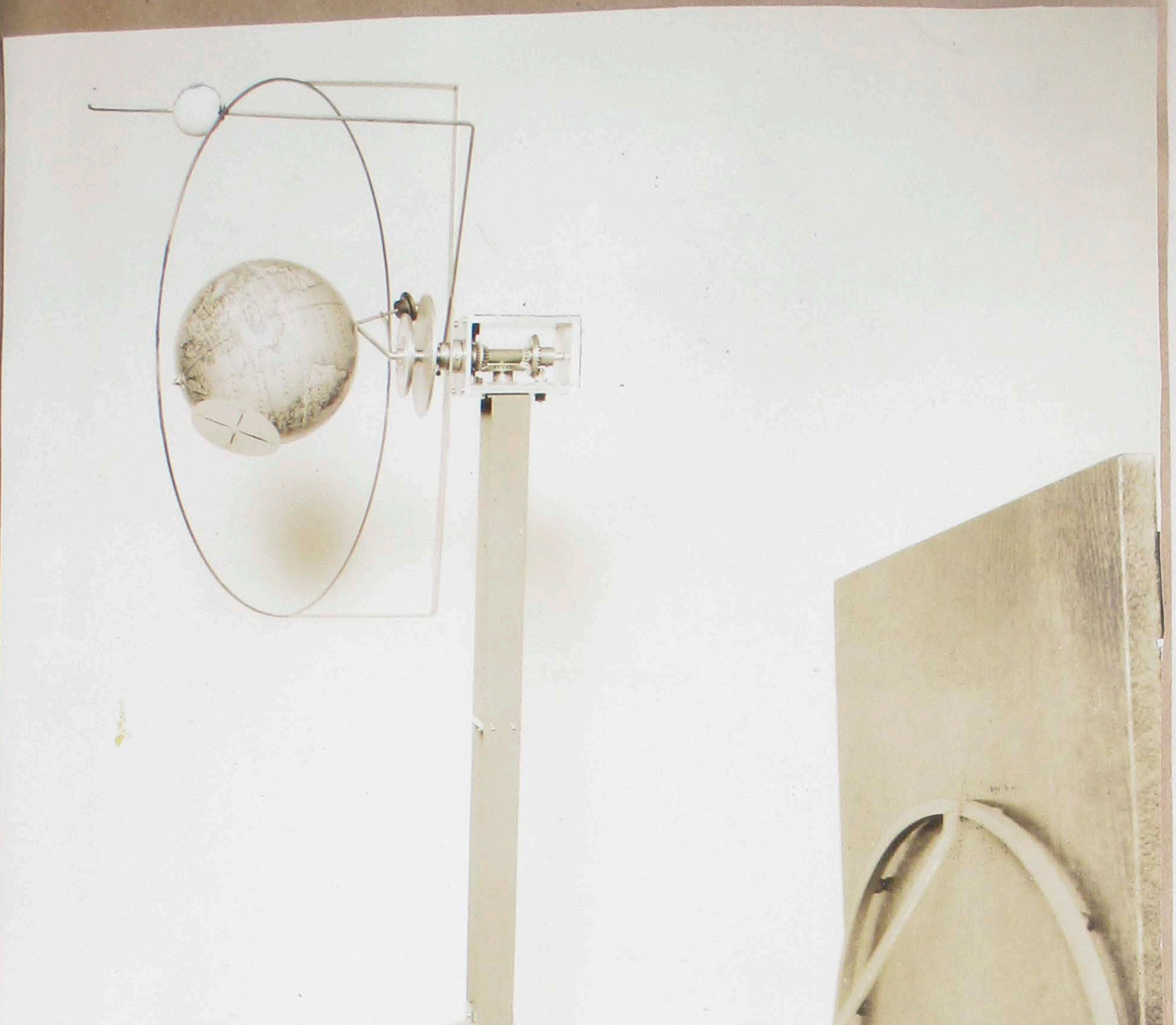


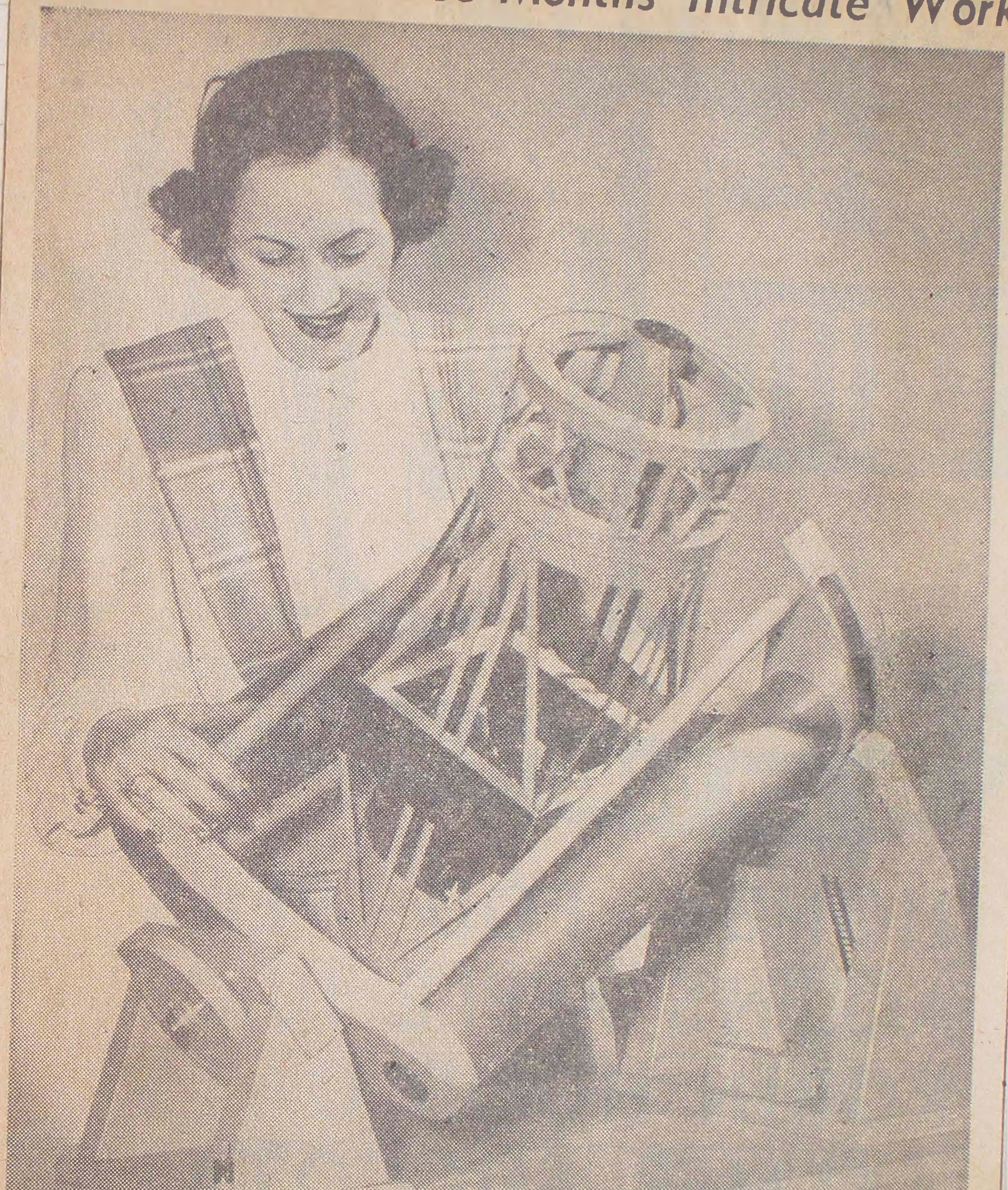
The First Large Satellunium

330

Built by Londoner

MAR. 17, 49

Premiere Showing of Model Telescope Follows Three Months Intricate Work



Designed and built by Mr. Colgrove.

Hundreds of Londoners will get their chance to see how modern science is penetrating the wonders of the expanding universe at the Hume Cronyn Memorial Observatory Friday night.

A scale model of the new 200-inch giant Hale Telescope on Mount Palomar in California will be shown the public for the first time. Rev. W. G. Colgrove, public lecturer in astronomy at the University of Western Ontario, who built the model will explain the intricate workings of the original machine.

* * *

'It took me three months to complete the model, which became a much more ambitious project than I had first undertaken," said the brisk, elderly scientist, who is famous for his construction of delicate equipment and astronomical models used in lectures.

A six-inch concave shaving mirror, cut to scale, represents the giant reflector in the California observatory, and Rev. Mr. Colgrove used a small compact mirror, from his wife's powder-puff, to act as the flat Conde mirror which is mounted in the centre of the tube proper, through which the heavens are sighted.

* * *

Colleen Lankin University of Western Ontario arts student, eyes admiringly the accurate working model made by Rev. W. G. Colgrove of the giant 200-inch Hale telescope at Mount Palomar, California.

The giant Palomar telescope will allow man to study the heavens as far away as a billion light years (a light year is the distance light travels in a year — nearly six trillion miles). The tube proper swings through an arc of 180 degrees, as does the horse-shoe mounting which carries it, and allows the observer to work 'closer to the horizon than ever before. The north star, out of range for many big instruments, can be seen readily.

At Mount Palomar, a mile above sea-level, there are usually 300 clear nights a year, good for astronomic observation. Observers on Western's campus can usually just count on six good nights.

The tube of the Hale Telescope weighs 80 tons and the horseshoe bearing weighs 150 tons. The mirror, the largest of its kind in the world, was 20 tons, but lost 5¼ tons when it was ground.

The whole model, built to scale, 1-40 the size of the original, weighs about 35 pounds, and was built so that it can be carried about the country to lectures on the back seat of a car, like all of Mr. Colgrove's equipment. The model is 25 inches high — the real thing towers 75 feet above the ground.

Rev. Mr. Colgrove constructed a tiny man, 1¼ inches high, representing a six-foot astronomer. The doll fits into an observer's cell at one end of the tube proper, and illustrates more effectively the enormity of this new tool of science for dissecting the universe.

* * *

The model telescope is the latest production of a man whose highly-technical teaching aids, built in his own workshop are in the university observatory. The rooms are hung with globes, and charts and working models of groups of the heavenly bodies which make astronomy more real to university students and guests at this evening lectures alike.

One of his latest creations was the "prismatic piano," which Rev. Mr. Colgrove prefers to call his "rainbow piano," believing this expresses more to the average man. When this is played, the room is lit up with harmonious colors, caused by combinations of notes creating combinations of light in the primary and secondary colors.

Rev. Mr. Colgrove retired from Pilgrim United Church 12 years ago. He has arranged more than 14,000 specimens of plants, wildflowers, grasses, trees and shrubs in the university's botanical collection, besides devoting time to astronomy, botany and invention.

* * *

After spending four years in the botanical department he began lecturing, photographing the heavens and engaging in astronomical research from 1940 when the Memorial Observatory was built.

Now, at the age of 77, he says: "The more I learn of the wonders of the heavens by actual practical observation, the more I find the recordings of science only confirm the spiritual discoveries of those who contributed to the Bible thousands of years ago."

Model Telescope Given Unveiling

Rev. W. G. Colgrove, lecturer in astronomy at the University of Western Ontario, last night earned the applause and congratulations of 40 astronomy enthusiasts at the public unveiling of his most recent scale-model masterpiece.

The veil was removed by Dr. H. R. Kingston, dean of the university, and Rev. A. J. Elson, United Church minister, during the regular monthly meeting of the Royal Astronomical Society, London Centre.

Tiny Model Man

The model, patterned on the 200-inch Hale telescope on Mount Palomar, California, is the product of weeks of painstaking and exacting effort on the part of the scientist. It is complete with all the move-

The telescope has a tube weighing 80 tons and a mirror weighing 14½ tons.

The model, painted grey, stands only about two feet high in comparison with the Palomar instrument which towers 75 feet.

Probes Secrets

"With such a machine," said Rev. Mr. Colgrove, "man may realize, in part, his desire to measure the universe, seek more extensive knowledge of the age and nature of the stars and, if possible, of the universe itself."

The astronomer went on to explain the problems faced by the men of Mount Palomar, "mountain of pigeons," and "Garden of Eden" for the scientists. Although, due to the height and climate of the site an estimated 300 nights of good visibility per year are expected, he said, they have their problems. The organization of the community, the intricacy of the scientific observations and the process of becoming familiar with the great telescope are no simple matters.

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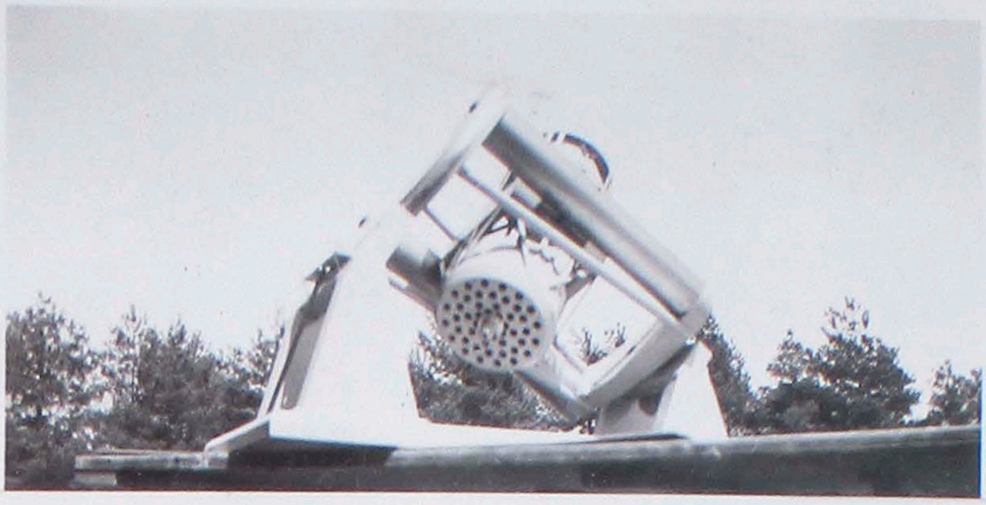

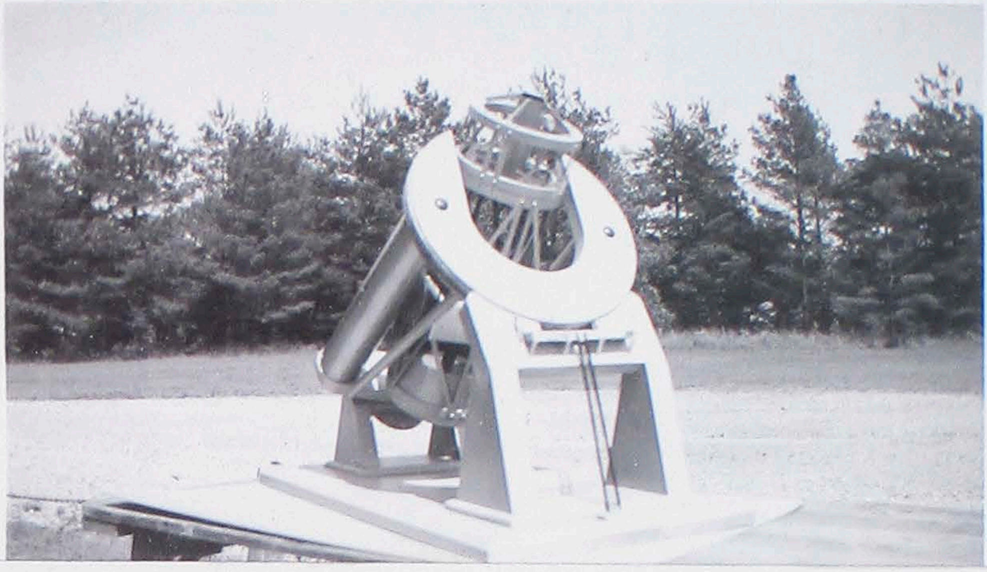

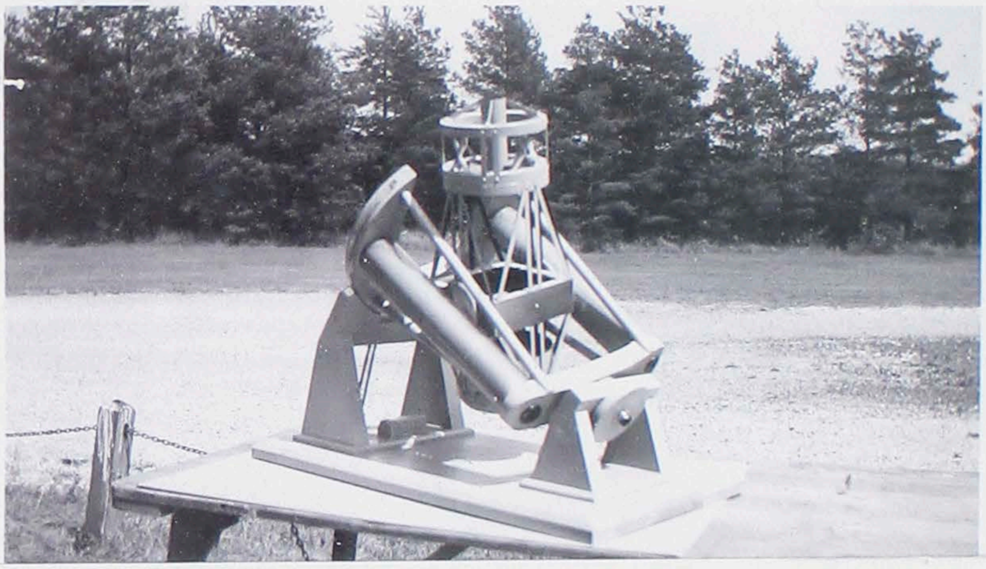

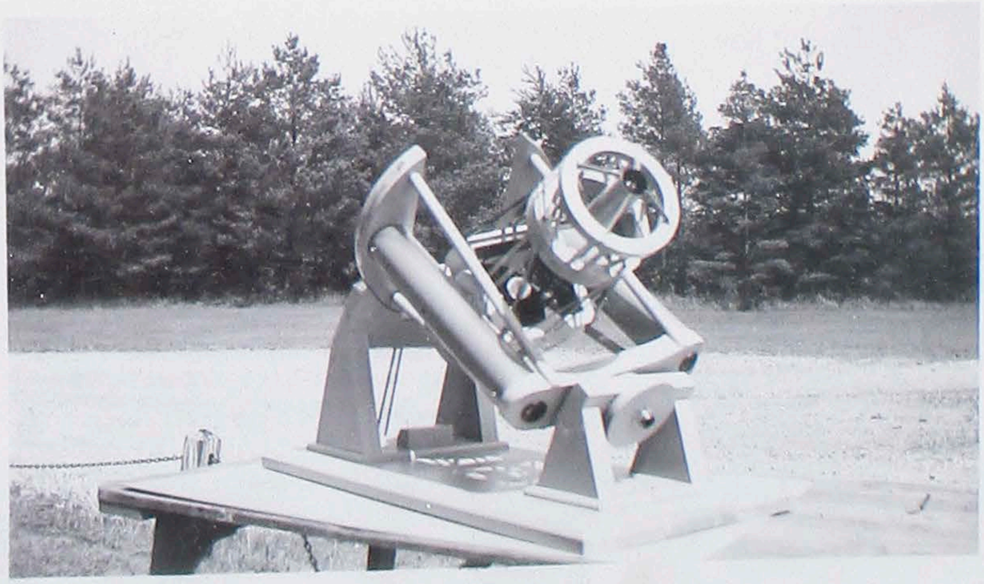

Four special snaps
of my model.

last quarter when we see the left half of the disc or quarter of its surface, and finally it comes to the position of new moon again. Between first quarter and opposition and between opposition and last quarter the phase is more or less gibbous. When new the moon rises and sets with the sun, at first quarter it rises at noon and sets at midnight, when full it rises at sunset and sets at sunrise, at last quarter it rises at midnight and sets at noon. The harvest moon and the hunter's moon are due to the variations of the daily average retardation of 51 minutes mentioned above. In northern latitudes it is most marked during September when the full moon rises at about the same time for several nights thus producing the harvest moon and prolonging the duration of moonlight so favorable for harvesting. In October the conditions are much the same and it is called hunter's moon.

29. SATELLITES—There are probably no moons attending the satellites.

30. ECLIPSES—Lunar eclipses occur whenever the full moon, in its revolution around the earth, passes into the earth's shadow. This can happen only when the earth is at or near one of the moon's nodes. A partial lunar eclipse occurs when the sun is so far from the moon's node as to allow the moon to partially hide in the earth's shadow. A total eclipse occurs when the sun is so near the moon's node that the moon is wholly hidden in the earth's shadow which stretches out into space from 845,000 to 873,000 miles according to its orbital position with reference to the sun. The diameter of the earth's shadow where the moon cuts it is about three times that the moon, so that a total lunar eclipse may last about 2 hours. There is an interesting relation between solar and lunar eclipses because the moon has to do with both. About two weeks before and after a total eclipse of the sun there will usually be a partial eclipse of the moon, and about two weeks before and after a total eclipse of the moon there will always be a partial eclipse of the sun. There must be at least two solar eclipses each year and there may be five. Occasionally there are also two lunar eclipses and there may be a third but sometimes none occur, according to the relation of the earth's shadow to the moon's node. Seven eclipses occurred in 1805 and the same number occurred again in 1935.

CHAPTER VIII

MARS.

1. NAME—Among the Greeks his name was Ares and Homer says he had two sons: Phobos and Deimos, whose names were given to his satellites. The Romans called him Mars the ruddy god of war.

2. SYMBOL—♂ A circle surmounted by an oblique dart representing the shield and spear, which were the main weapons of ancient warfare.

3. MARKINGS—There are snow caps at the poles, three zones between and many lines which radiate from dark spots, one of which is called Syrtis Major, the great sand bank, and another Solis Lacus, the lone lake or "Eye" of Mars. Clouds and frost are sometimes visible, the former at the fringe of the polar caps and the latter on the eastward edge at sunrise. The so-called seas are evidently not open water, which would cause great gleams of light. The caps increase in winter from the poles toward the equator. They are only a few feet thick but with a temperature of —100°F. The S cap often disappears in the summer but part of the N cap remains. Anything to be seen with present telescopes, must be 15 miles across.

4. LINEAR DIMENSIONS—Its angular diameter at mean distance from the earth is 6 seconds of arc from which we obtain its actual diameter of 4,220 miles. Its polar diameter is about 25 miles less. One can readily find from this its other dimensions.

5. MASS—This is only 1/9 of the earth or 665 quintillion tons (665 followed by 18 ciphers). It is determined from the attraction of Mars for its moons.

6. DENSITY—About 3.92 times that of water or .72 of the earth's amount and a little over 3 times that of the sun.

7. SURFACE GRAVITY—About .38 of the earth. The inhabitants should be tall and their work rather easy.

8. PERIOD OF ROTATION—24 hrs. 37 min. 22.6 sec. This is measured by the motion of the markings on its surface and makes a day similar to ours. Its velocity of rotation is about 628 miles per hour at its equator.

9. DAYS IN ITS YEAR—There are about 670 Martian days in its year, which is almost twice as long as ours.

10. OBLATENESS—.0052 of 1/192. Since the surface gravity is only a little more than 1/3 of ours and the density only 7/10 of the earth's one might expect to find greater polar depression and equatorial bulge but its small size probably accounts for its absence.

SOME SOLAR SYSTEM DATA
333

MARS

11. INCLINATION, EQUATOR TO ORBIT—23°40′ of arc. This is similar to that of the earth and causes seasons similar to ours but on account of its greater orbit they are nearly twice as long. Its seasons are naturally colder than ours. On the northern hemisphere late spring, summer and early fall cover 381 days, while late fall, winter and early spring cover 306 days. On the southern hemisphere the climatic conditions are just the reverse and their difference more pronounced.

12. SOLAR RADIATION—Mean .43 of the earth's amount or less than half as much per unit area. It receives half as much again at perihelion as at aphelion and passes its perihelion during its southern summertime.

13. TEMPERATURE—The most recent measures with the thermocouple using the F. scale give 15° to 50° for the south pole at noon in summertime; 65° to 75° for the south temperate zone in summer, and 65° to 85° at noon in the tropics. In the north temperate zone during the winter it varies from 30° to 60° below zero. It reached more than 50° below zero every night.

14. ATMOSPHERE—This is probably only half as dense as ours, and is said to be 120 miles high. The planet's disc, unlike that of Venus, occults stars quite sharply because the percentage of water vapor is unusually low and clouds are rare.

15. DISTANCE FROM EARTH—This varies from about 35,000,000 miles at nearest special opposition to about 250,000,000 miles at farthest conjunction and its mean distance from us is about the same as the sun. The average distance at conjunction is 234.5 million miles; at opposition it is 48.5 million miles, depending on whether the opposition is near perihelion or aphelion. At the former it would be 34.5 million miles, at the latter 63 million.

16. DISTANCE FROM SUN—Mean about 141,540,000 miles. At perihelion it is close to 128,320,000 miles and at aphelion it is 154,760,000 miles. This is the cause of the variation in the amount of solar energy received and is due to the great eccentricity of the orbit.

17. DIMENSIONS OF ORBIT—The mean diameter of its plane orbit is about 283,000,000 miles from which we get a circumference of about 890,000,000 miles. But as we have already seen the real path is a quite open helix.

18. HELICAL PATH—In this continuous helical journey along with the sun Mars traverses, during each revolution of 687 days or one Martian year, some 1,162,200,000 miles or about 272,200,000 miles more than are given for its plane orbit. As we have previously noted, these greater distances require higher speeds.

MARS

19. PERIOD OF REVOLUTION, SIDEREAL—687 of our days, usually called mean solar days, or about 1 year and 11 months. This is the time it takes Mars to make a circuit of the sky with reference to any particular star in the zodiac as seen from the sun. Its syndodic period is 780 of our days.

20. VELOCITY OF REVOLUTION—This varies rather widely on account of the eccentricity. Its mean for the plane orbit is about 15 miles per second but in its helical path it is about 19.54 miles per second.

21. ECCENTRICITY OF ORBIT—.093. The sun is thus out of centre about 13,000,000 miles which amounts to a total difference of 26,000,000 miles between perihelion and aphelion distances. This accounts for the unequal seasons on the two hemispheres, those of the southern hemisphere being the more extreme because Mars passes its perihelion during the southern summertime.

22. INCLINATION, ORBIT TO ECLIPTIC — 1°51′ of arc. This is very small and provides no appreciable north and south librations.

23. LONGITUDE OF PERIHELION—About 334°. The aphelion point is opposite.

24. ELONGATION—For Mars and the outer planets this may be anywhere from 0° to 180°. At 0° it is in conjunction, at 90° and 270° it is in quadrature and at 180° it is in opposition.

25. CONJUNCTIONS—Conjunctions of Mars and the outer planets with the sun are similar to superior conjunctions of Venus and Mercury with the sun. The average distance of Mars at this time is about 234,500,000 miles. Conjunctions occur in harmony with the synodic period every 780 days. They also happen with the moon and the other planets.

26. QUADRATURE—This is an east or west position of Mars and the outer planets when a line from the earth to the planet is at right angles to a line from the earth to the sun.

27. OPPOSITION—This occurs with Mars and the outer planets when they reach a point in their orbits directly opposite the sun from us. As we have already remarked we sometimes come within 35,000,000 miles of Mars at this time. After such a close approach the distance between us at subsequent oppositions gradually increases for about 7 and 1/2 years when it occurs in February and the distance is slightly more than 61,000,000 miles; from this time the distance decreases for another 7 and 1/2 years only to begin again in August.

28. PHASES—The planets beyond our orbit do not exhibit a crescent phase but are always gibbous or full.

SOME SOLAR SYSTEM DATA

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29. SATELLITES—Mars has two. Phobos and Deimos, which revolve around its equator. Both were discovered by Hall at Washington in 1877. He named them after two of Mars' sons, the one Fright and the other Terror. The former is nearer and brighter than the latter and is said to be 15 miles in diameter and 3,700 miles from the surface of Mars. It revolves in the very brief period of 7 hours 39 minutes, thus circling it primary more than 3 times in a Martian day and therefore rising in the west and setting in the east. The latter is from 5 to 8 miles in diameter, is 12,600 miles away, revolves in 30 hours, 18 minutes and thus remains above the horizon of Mars for about 60 hours at a time and presents all its phases twice between rising and setting. These moons are so small that the light of either on Mars is no more than we receive from Venus and even when both appear together in the sky they are of no real value to the Martians.

30. ECLIPSES—They would have little interest for us but to the Martians they may be very interesting. When Phobos passes directly between Mars and the sun they would enjoy a partial or an annular eclipse. The projection of Phobos on the sun would be a large dark spot and the shadow of Phobos on Mars would be very small. Deimos would be just as interesting but its shadow cannot reach Mars.

CHAPTER IX

PLANETOIDS

This is a very brief chapter, in which we shall not follow the order of items closely but only as our summary requires.

The name, as given above, is the only proper one because these little bodies are not astral in any sense except that they look like stars. They should not be called asteroids because their brightness is only reflected sunlight. More than a thousand of them have now been discovered, charted and numbered and there are probably many hundreds more of small size revolving between the outer planets. We shall speak in detail of only five; the first four discovered, which are also the largest, and one of the more recent which is among the smallest known. The visual method of search has long since given place to the camera.

Astronomers have used mythological names for many of them and have also numbered them with the date of discovery. No. 1 was discovered by Piazzi on January 1, 1801, and is called Ceres after the goddess of grain and guardian of agriculture. No. 2 was discovered by Olbers in 1802 and is called Pallas, the goddess of wisdom and guardian of learning. No. 3 was discovered by Harding in 1804 and is called Juno, the goddess of heaven and guardian of the family. No. 4 was discovered by Olbers in 1807 and is called Vesta, the goddess of the hearth and guardian of the home. No. 433 was discovered by Witt in 1898 and is called Eros, the god of love and guardian of productivity. By 1900 there were 463 recorded; in 1920 the list had grown to 944 and in 1923 it reached the 1,000 mark. Since than many more have been added, and by 1941 there were 1,500 on the list.

The stellar magnitude of these little worlds is very low. The brightest, not the largest, is Vesta, which is of the sixth magnitude and may be occasionally seen with the naked eye. All the others require a telescope to find them and then one must know them well to be sure of their identity. Eros was of the eleventh magnitude when discovered but this varies with its distance and the surface it presents to us.

The angular diameters of some are known but most of them are very difficult or impossible to measure because of their smallness, distance and irregularity of shape. The linear diameters of the five mentioned above are: Ceres, 480 miles; Pallas, 304 miles; Juno, 120 miles; Vesta, 240 miles; while little Eros is very irregular and is said to average between 8 and 10 miles in width and from 25 to 30 miles in length.

Their volumes are: Ceres, 57,900,000 cubic miles; Pallas, 14,710,000 cubic miles; Juno, 905,000 cubic miles; Vesta, 7,240,000 cubic miles; and Eros only about 4,000 cubic miles. The combined volume of all the planetoids would not make a sphere 1,000 miles in diameter.

Their densities are very difficult to determine but it is said that if the density of Ceres were similar to that of the earth its mass might be 1/8,000 and its surface gravity about 1/30 of the earth's.

Under the powerful perturbing influence of Jupiter, many of these bodies have been forced into orbits which lie in the great open space between its orbit and that of Mars. The mean distances of these five are: Ceres, 255,000,000 miles; Pallas, 250,000,000 miles; Juno, 248,000,000 miles; Vesta, 220,000,000 miles; and Eros, 135,430,000 miles from the sun.

The angles of inclination vary from almost 0° to about 50° but most of them do not reach 1/3 of the maximum, the average being about 9°30′. Some of them reach beyond the zodiac while the plane of the orbit of Eros is at an angle of 11° from the ecliptic.

The ratios of eccentricity of the orbits vary from almost .0 to about .65 but most of them do not reach half of the maximum, the average being about .15. A few of them swing out beyond the orbit of Jupiter, while others come within that of Mars. In the case of Eros, an eccentricity of .22 enables it to come before,

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at, and after its perihelion passage which is only 21° from ours, far within the orbit of Mars and as close to us as 13,850,000 miles. At perihelion it is about 105,200,000 miles from the sun but at aphelion it sweeps out to 24,000,000 miles beyond the orbit of Mars and reaches a point 165,630,000 miles from the sun. In 1931 Eros came within 16,200,000 miles of the earth.

The sidereal periods range from less than 2 to more than 13 years. Ceres takes 1,681 days, Pallas 1,685 days, Juno 1,592 days, Vesta 1,326 days, and Eros only 643 days. Its synodic period is 845 days and it retrogrades 30′ of arc.

The planetoids have arranged themselves in singles, doubles and groups and the study of the groups in connection with Bode's law is very interesting. They are probably not the debris of an exploded planet but simply unused material floating in space.

NOTE:—In 1932 a very small planetoid was discovered and designated 1932 H. A. It is between 2 and 3 miles in diameter; at perihelion it is 63,000,000 from the sun; its period is a little over 21 months; its orbit is inclined from the ecliptic 6°30′ and has a circumference of about 280,000,000 miles. In 1932 it came within 7,000,000 miles of the earth and it can come within 2,500,000 miles of us, or nearer than any other heavenly body except the moon or an occasional comet or meteor.

CHAPTER X

JUPITER.

1. NAME—The Greeks named it Zeus, the father of the gods and ruler of Mt. Olympus. The Romans called it Jove or Jupiter, the wielder of thunderbolts.

2. SYMBOL—♃ This is supposed to represent a flash of lightning or the first letter of Zeus.

3. MARKINGS—There is a broad, light-coloured equatorial belt about 10,000 miles wide, while above and below it are two darker belts of almost equal width. These are followed, toward the poles, by other narrower belts that present a rippled appearance. This banded effect pertains only to the cloud envelope which is so dense and deep that the actual surface of Jupiter, like that of Venus, is never seen. On account of the rapidity of rotation these markings are always changing and in 1878 a great oval pink area 30,000 miles long and 7,000 miles wide appeared and moved slowly across the planet.

4. LINEAR DIMENSIONS—Its angular diameter at mean distance from us is about 37 seconds of arc from which we

obtain its actual diameter of 87,000 miles. This is 11 times the earth and 1/10 of the sun. One can easily calculate the other dimensions from this.

5. MASS—318 times the earth or 1/1,000 of the sun and nearly 3 times that of all the other planets put together. Its weight would be nearly 2 septillion tons. This huge mass causes the sun-Jupiter system to revolve around their mutual centre of gravity about 7,000 miles outside the sun and thus complicates the orbit problem.

6. DENSITY—About 1.34 times that of water or nearly the same as the sun and .242 of the earth.

7. SURFACE GRAVITY—2.65 times that of the earth. The fast rotation and great oblateness make the gravity at the poles 15 per cent. less than at the equator.

8. PERIOD OF ROTATION—Mean 9 hrs. 58 min. The equatorial belt rotates in about 5 min, less so that during 85 rotations the equator makes about 86. This is a brief day of only about 5 hrs. light and 5 hrs. darkness. Its velocity of rotation at its equator is 7.73 miles per second or 27,800 miles per hour or 26 times as fast as the earth. This causes the oblateness and the violent winds that rage at 250 miles per hour.

9. DAYS IN ITS YEAR—There are about 10,484 Jovian days in its year.

10. OBLATENESS—.056 or about 1/18, Jupiter is the most oblate of all the planets except Saturn and its shape is quite noticeable in a telescope.

11. INCLINATION, EQUATOR TO ORBIT—3°5′ of arc. This angle is so small that the Jovian days will each be almost the same length throughout the long year and produce almost perpetual seasons with hardly any climatic changes.

12. SOLAR RADIATION—.037 of the amount we receive, that is we get about 27 times as much per unit area. It sends us about 1/1000 of the amount we receive from the moon.

13. TEMPERATURE—Since Jupiter receives only 1/27 as much light as we do, its cloud surface will be very cold, perhaps —266°F. It seems possible, however, that the temperature of the actual surface may not be so cold and that internal sources may provide much local heat which is largely retained by the unbroken cloud envelope.

14. ATMOSPHERE—In the spectrum of Jupiter's clouds there are dark bands which indicate a very dense atmosphere. The content is largely methane and ammonia which are lethal for us.

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15. DISTANCE FROM EARTH—Mean 483,600,000 miles. At nearest opposition it is about 367,000,000 miles and at farthest conjunction it is more than 599,700,000 miles.

16. DISTANCE FROM SUN—Mean about 483,300,000 miles. At perihelion it is about 460,000,000 miles at aphelion over 506,700,000 miles. Jupiter is more than 5 times as far from the sun as we are.

17. DIMENSIONS OF ORBIT—The mean diameter of the plane orbit is given as 967,200,000 miles and its circumference 3,039,000,000 miles but its real path is a very open helix.

18. HELICAL PATH—In this continuous helical journey along with the sun Jupiter traverses, during each revolution of about 12 of our years or one Jovian year, some 5,608,860,000 miles or about 2,571,860,000 miles more than are given for its plane orbit. This requires higher speed.

19. PERIOD OF REVOLUTION SIDEREAL—11.86 of our years. Its synodic period is 399 of our days.

20. VELOCITY OF REVOLUTION—In the plane orbit assigned to it a speed of 8 miles per second or 29,000 miles per hour has been suggested but this is wholly imaginary because it is flying in an endless helical path at almost 15 miles per second instead.

21. ECCENTRICITY OF ORBIT—.048. Thus the sun is out of centre some 23,500,000 miles making a difference of about 47,000,000 miles between perihelion and aphelion distances. This is so small compared to the orbit that there is no appreciable difference in the intensity of the sun's radiation and it causes but slight variation in the planet's orbital velocity.

22. INCLINATION, ORBIT TO ECLIPTIC—1°18′ of arc. This is such a small departure from the ecliptic that the ancients noticed it and called it the ecliptic planet.

23. LONGITUDE OF PERIHELION—About 13°. Aphelion is opposite.

24. ELONGATION—This is the angular distance between the sun and the planet as seen by us and varies from 0° to 180° according to the planet's position in its orbit. For the outer planets it is usually spoken of as one of the three following items.

25. CONJUNCTIONS—These occur with the sun every 399 of our days and therefore about 5 weeks later each time. They also occur with the moon and the other planets.

26. QUADRATURE—There are two each year, one east and the other west of the sun. There are 175 days between them and at each point the planet is 90° of arc from the sun as seen by us. The right angle is at the earth.

27. OPPOSITION—These occur on the opposite side of the orbit from the conjunctions every 399 days and, like them, 5 weeks later each time. At this time the retrograde motion occurs.

28. PHASES—These are always gibbous or full.

29. SATELLITES—These are eleven in number, The first four are the largest, were discovered in 1610 by Galileo and have been called the Galilean satellites. No. 1, Io, is of magnitude 6.5, diameter 2,450 miles, distance from Jupiter 261,000 miles, and revolves in 1 dy. 18 hrs. 28 min. No 2 Europa, is of magnitude 6.5, diameter 2,050 miles, distance 415,000 miles, and revolves in 3 dys. 13 hrs. 14 min. No. 3 Ganymede, is of magnitude 6, diameter 3,560 miles, distance 664,000 miles, and revolves in 7 dys. 4 hrs. No. 4, Callisto, is of magnitude 7, diameter 3,350 miles, distance 1,167,000 miles, and revolves in 16 dys. 16 hrs. 32 min. The other seven have numbers but no names. No. 5 is the nearest of all, is of magnitude 13, diameter 100 miles, distance 112,500 miles, and revolves in 11 hrs. 57 min. The remaining satellites are very small and very distant and for their details we refer the reader to the Observer's Handbook. All the moons that shine on the night side of Jupiter at any one time do not furnish 1/16 of the amount we receive from our full moon. Nos. 8 and 9 revolve backward. The four large satellites vary in brightness according to their periods of revolution and probably present the same face to their primary.

30. ECLIPSES—These, like the transits across the planet are occurring continually. Each year about 9,000 take place. Nos. 1, 2, 3 are eclipsed during each revolution because they are in almost the same plane as Jupiter's equator which is close to the ecliptic, but No. 4 escapes sometimes on account of its greater inclination. It was the differences in the times of these eclipses that attracted Roemer's attention and by which he was able to measure the speed of light.

CHAPTER XI

SATURN.

1. NAME—Saturn was the name of an ancient mythical Roman king who had been lord of Mount Olympus but had been forced to abdicate by his powerful son, Jupiter. He is said to have ruled Italy during its golden age. His name means sower and he presided over the sowing of seed and the measuring of time. His annual festival was held on December 17, shortly after the winter sowing and became a very widely observed feast, called the Saturnalia.

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SATURN

2. SYMBOL— ♄ A sickle corresponding to the scythe of Father Time and this because the planet was the slowest known to the ancients.

3. MARKINGS—The globe is banded above and below the equator and is surrounded by three concentric rings which differ in density and amount of surface presented to us during its revolution.

4. LINEAR DIMENSIONS—The mean diameter is about 72,000 miles, the polar about 68,000 miles and the equatorial 76,400 miles. The mean is more than 9 times that of the earth and the circumference is about 226,900 miles.

5. MASS—This is about 95 times that of the earth and 1/3500 of the sun. In weight it would be about 570 sextillion tons.

6. DENSITY—.72 of water or .13 of the earth and 1.39 times the sun. It is the least dense of all and this indicates a very gaseous condition. It would float on water.

7. SURFACE GRAVITY—About 1.18 times that of the earth but it varies by almost 1/3 between the equator and the poles.

8. PERIOD OF ROTATION—10 hrs. 14 min. 23 sec. This was first determined by Hall in 1876 through his observation of the movement of a bright spot on the planet's surface. There are therefore only about 5 hours daylight and 5 hours darkness during each of its days, similar to Jupiter. Its velocity at its equator is 6.3 miles per second or about 23,000 miles per hour.

9. DAYS IN ITS YEAR—On account of the very rapid rotation and its large orbit there are over 25,270 Saturnian days in its year.

10. OBLATENESS—.11. This is the greatest of all the planets and is caused by its rare density and the rapidity of rotation. The equatorial diameter is 8,400 miles more than the polar.

11. INCLINATION, EQUATOR TO ORBIT—26°30′ of arc. This is only a little more than the earth's so that each pole and each side of the ring enjoy 14 years and 8 months of sunlight and then a similar period of shadow. This produces marked seasonal changes similar to the earth but more pronounced and about 7 times as long. But since a gaseous condition still obtains we cannot think of seasons in a terrestrial sense.

12. SOLAR RADIATION—.011 of the amount we receive per unit area or about 1/90 as much. This means that the surface which we see and which is entirely composed of clouds must be very cold.

SATURN

13. TEMPERATURE—The temperature of a body which probably possesses heat, as well as receives it, is not easy to determine but a recent estimate sets it at —311°F. This of course is for the surface only and it is too high for solar heat alone so that a local supply is indicated.

14. ATMOSPHERE—The spectrum of Saturn's clouds suggests a deep, dense atmosphere but the rings do not seem to possess any. The content is largely methane and ammonia.

15. DISTANCE FROM EARTH—Mean 886,000,000 miles. At nearest opposition it is about 748,000,000 miles and at farthest conjunction 1,024,000,000 miles.

16. DISTANCE FROM SUN—Mean 886,000,000 miles. At perihelion it is about 841,000,000 miles and at aphelion 931,000,000 miles. It might be well to recall here that the mean solar distance of a planet is one-half the major axis of its orbit.

17. DIMENSIONS OF ORBIT—The mean diameter of its plane orbit is said to be something like 1,772,000,000 miles and its circumference 5,564,100,000 miles but we must remember that the real shape of this orbit is a wide open helix.

18. HELICAL PATH—In this continuous helical journey along with the sun Saturn traverses, during each revolution of 29.46 of our years or one Saturnian year, some 12,621,000,000 miles or about 7,056,900,000 miles more than are given for its plane orbit. Keeping up with the sun requires higher speed.

19. PERIOD OF REVOLUTION, SIDEREAL—29.46 of our years. This is the planet's year. Its synodic period is 377.5 of our days.

20. VELOCITY OF REVOLUTION—In its plane orbit it is said to be about 6 miles per second or 21,500 miles per hours but the velocity in its helical path is about 13.5 miles per second and varies only slightly with the eccentricity.

21. ECCENTRICITY OF ORBIT—.056 The sun is thus out of centre about 45,000,000 miles, making a difference of 90,000,000 miles between perihelion and aphelion distances. This is not much for the size of the orbit and will not seriously affect the power of the sun nor the obital speed of the plant.

22. INCLINATION, ORBIT TO ECLIPTIC—2°30′ of arc. This is a small angle and makes any librations unimportant.

23. LONGITUDE OF PERIHELION—This is about 91°. Aphelion is opposite.

24. ELONGATION—This as we have seen is the angular distance of a planet east or west of the sun as seen from the earth but for the outer planets it is usually spoken of in terms of items 25 26 and 27.

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25. CONJUNCTIONS—These occur with the sun every 377.5 days when the planet is hidden for a time in the intense light of the sun. They occur 12.5 days later each time. Conjunctions also occur with the moon and the other planets.

26. QUADRATURE—This occurs twice each year, once on the east and once on the west of the sun as seen by us and always 90° from the sun.

27. OPPOSITION—This is the position of an outer planet when we pass between it and the sun. Like the conjunctions, it is controlled by the synodic period so they happen every 377.5 days, with a delay of 12.5 days each time.

28. PHASES—These are unimportant because they are always nearly full.

29. SATELLITES AND RINGS—Saturn possesses a large family of satellites. The first and largest was discovered by Huygens in 1655 and named Titan. It is of the ninth magnitude, is at a mean distance of about 771,000 miles from Saturn, has a sidereal period of 15 dys. 22 hrs. 41 min, a diameter of 3,000 miles and a mass of .00021 of Saturn. The farthest and smallest was discovered by W. H. Pickering in 1898 and called Phoebe. It is of magnitude 14, mean distance 8,034,000 miles, and has a period of 550 dys. The nearest, called Mimas, is of magnitude 17, is only 115,000 miles distant, has a diameter of 400 miles and revolves in about 22 hrs. 37 min. The five nearest revolve in almost the same plane as their primary, the next two are quite near this plane but the others, excepting Phoebe, are inclined from 10 to 20 degrees. These nine moons together have only six times the volume of ours, while the light available from all that shine on Saturn at any one place is less than 1/100 of what we receive from our full moon.

Besides these regular satellites, Saturn is surrounded by a remarkable system of rings. These are concentric, flat and very broad and revolve in the plane of the planet's equator, in the same direction but at different speeds. Like the satellites of Jupiter they were first seen by Galileo in 1610 but were not understood until 1655 when Huygens made his observations. The outer diameter of the outside ring is about 172,600 miles and its breadth about 11,000 miles, then there is a space of 2,300 miles called Cassini's division. This is followed by another broader, brighter ring whose outer diameter is about 146,000 miles and its breadth 18,000 miles. Then comes a very narrow division and a third ring of dusky colour having an outer diameter of 110,000 miles and a breadth of 10,900 miles. The dark ring is like a veil through which at times we can see the disc of the planet and its inner edge is about 6,000 miles from the surface of Saturn. The thickness of the rings is probably about 20 miles and they are composed of swarms of meteoric bodies which somehow got into the control of Saturn. On account of their inclination of 26°30′ to the plane of their orbit and 2°30′ more to the plane of the ecliptic these rings apparently open out and close up as the years pass. In 1943 they were at their widest and now they are gradually closing up again, each process requiring 7.5 years.

30. ECLIPSES—Like the transits these are constantly recurring because, as we have seen, the five nearest satellites revolve in the same plane as their primary.

CHAPTER XII

URANUS.

1. NAME—Uranus means Heaven or Sky. It was the first planet discovered, the others, except Neptune and Pluto, had been known for many centuries. Sir Wm. Herschel discovered it in 1781 and called it Georgium Sidus in honour of the king. Later, at the suggestion of Bode, it was given its present name which is more in keeping with the mythological names of the other planets.

2. SYMBOL—♅ This is a combination of shield and dart designed to replace the H first used in honour of its discoverer.

3. MARKINGS—Even in a large telescope it appears as a very small disc and only under the best seeing conditions can the bands be discerned. It is green in color.

4. LINEAR DIMENSIONS—Its mean diameter is about 30,400 miles, the polar 29,000 miles and the equatorial 31,800 miles. This is nearly 4 times that of the earth or 1/28 of the sun and the circumference is about 95,500 miles.

5. MASS—14.6 times that of the earth or 1/23,500 of the sun. It would weigh something like 85 sextillion tons.

6. DENSITY—1.25 times that of water or .23 of the earth and similar to the sun.

7. SURFACE GRAVITY—.9 of the earth so that an object weighing 100 pounds here would weigh only 90 pounds there.

8. PERIOD OF ROTATION—This is about 10 hrs. although it is not divided into daylight and darkness all round the orbit as is the case with the other planets. Its velocity is about $2\frac{1}{2}$ miles per second or 9,000 miles per hour at its equator.

9. DAYS IN ITS YEAR—Ordinarily there would be about 65,400 of its days but since its equator is greatly tilted there

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are four peculiar seasons; two polar and two equatorial, but each very gradually changing into the next as the planet proceeds in its orbital journey. During the polar seasons there is but one day of 21 years for each while during the equatorial seasons there are 16,350 days in each, thus making a total of about 32,700 Uranian days in its year.

10. OBLATENESS—.09. There is therefore very little polar flattening or equatorial bulge.

11. INCLINATION, EQUATOR TO ORBIT—98° of arc. In this case the axis is nearly parallel to the plane of the orbit and thus produces the unusual seasons mentioned above. If we begin when one polar hemisphere is facing the sun it will have a very long cool summertime of 21 years' duration in continual daylight with the small distant sun apparently revolving around the pole while the other polar hemisphere turned from the sun endures an exceedingly frigid winter of the same length and in total continual darkness because the tiny satellites cannot relieve it. As the planet gradually passes from this position the equatorial regions come into the sunlight for 21 years but, unlike the polar hemispheres, they enjoy night and day of about 5 hours each. After 42 years Uranus arrives at the opposite position from the one first considered and the other polar hemisphere has its 21 years of chilly summertime in continual daylight while the other goes into refrigeration and darkness. The planet keeps moving and again the equatorial regions arrive for their long season of short days and nights.

12. SOLAR RADIATION—.003 or 1/333 of our supply per unit area. This is very small because of its great distance from the sun and yet it amounts to 700 times as much as our full moon sends us.

13. TEMPERATURE—About —340°F. Like the other large planets, Uranus must still be highly gaseous and while the cloud surface must be very cold the actual surface may receive considerable heat from internal sources.

14. ATMOSPHERE—The spectroscope indicates a dense cloud-laden atmosphere similar to the other bright planets. Its content is similar to that of Jupiter and Saturn.

15. DISTANCE FROM EARTH—Mean about 1,782,300,000 miles. At nearest opposition it is about 1,605,800,000 miles and at farthest conjunction 1,959,800,000 miles.

16. DISTANCE FROM SUN—Mean about 1,782,300,000 miles. At perihelion it is about 1,698,800,000 miles and at aphelion 1,866,800,000 miles. This is just a little more than 20 times our distance from the sun.

17. DIMENSIONS OF ORBIT—The mean diameter of the plane orbit is given as 3,564,600,000 miles and the circumference 11,203,000,000 miles but the real path is a very wide open helix.

18. HELICAL PATH—In this continuous helical journey along with the sun Uranus traverses, during each revolution of 84 of our years or one Uranian year, some 35,383,000,000 miles or about 24,183,000,000 miles more than are given for its plane orbit. To cover these greater distances requires higher speed than given for the plane orbit.

19. PERIOD OF REVOLUTION, SIDEREAL—84.02 of our years and about 7 times as long as Jupiter's. This is its year of four unusual seasons, each 21 earth years in length. Its synodic period is 369 of our days.

20. VELOCITY OF REVOLUTION—In the plane orbit it is said to be about 4 miles per second or 14,040 miles per hour, but the velocity in its real helical path is over 13 miles per second, or 46,800 miles per hour.

21. ECCENTRICITY OF ORBIT—.047. The sun is thus out of centre about 84,000,000 miles, making a difference of 168,000,000 miles between perihelion and aphelion distances. This is so small that it does not alter the planet's speed or its distance from the sun sufficient for ordinary observation to detect.

22. INCLINATION, ORBIT TO ECLIPTIC—Only 46′ of arc. This is the least of all and therefore the orbit is in almost the same plane as the ecliptic. If now we recall the other inclination of 98° we see that the planet with its moons appears as a windmill presenting its face, its back and its edge to us at different stages in its revolution.

23. LONGITUDE OF PERIHELION—About 169°. Aphelion is opposite.

24. ELONGATION—This is the angular distance of Uranus from the sun as seen by us but is it usually expressed in terms of the three following items.

25. CONJUNCTIONS—These occur every 369 days when the planet is hidden in the sun's brilliant light. They also occur with the moon and the other planets.

26. QUADRATURE—This occurs twice each year east and west of the sun and always at an angle of 90° at the earth.

27. OPPOSITION—This also occurs every 369 days when we pass between the planet and the sun and therefore 3 and 3/4 days later each time.

28. PHASES—These are of very little importance because the gibbous phase is very broad and we see it as full.

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29. SATELLITES—Uranus has a retinue of four tiny moons which, on account of the great inclination of the axis, revolve backward during half of each Uranian year and in almost the same plane as the planet's equator. When the earth passes through their line of nodes their orbits appear edgewise and almost vertical. This occurred in 1924 and will occur again in 1966 but in between they will gradually open to our view until 1945 when they will be wide open. These moons were discovered by two English astronomers, Sir Wm. Herschel and Wm. Lassell. In 1787 Herschel who had previously discovered Uranus, found the two larger and outer ones and called them Oberon and Titania. The former has an estimated diameter of 800 miles, a distance of about 365,000 miles from Uranus, and a sidereal period of 13 days 11 hours. The latter has a diameter of perhaps 1,000 miles, a distance of about 273,000 miles, and a period of 8 days 17 hours. In 1851, about sixty-four years later, Lassell found the two smaller and nearer ones and named them Umbriel and Ariel. The former has a diameter of about 400 miles, a distance of about 167,000 miles, and a period of 4 days 3.5 hours. The latter has a diameter of perhaps 500 miles, a distance of about 120,000 miles, and a period of 2 days 12.5 hours. They will be full face toward us in 1945.

30. ECLIPSES—These, like the transits and occulations are exceedingly rare and inconspicuous for us.

CHAPTER XIII

NEPTUNE

1. NAME—The word Neptune is probably from the Latin napta meaning moist and pertaining to water and the sea. The Greeks called it Poseidon and worshipped him in many cities and on many shores, especially at Corinth where the Isthmian games were held in his honour. Before Neptune was discovered in 1846, its position was calculated by Adams of Cambridge and sent to the Astronomer Royal, who carelessly failed to make the search. Meanwhile, Leverrier of Paris had also determined its position and sent it to Galle at Berlin who immediately made the search and found it within a degree of the mathematical location given. These calculations were based on the perturbations of Uranus caused by the unknown planet and constitute one of the greatest astronomical triumphs of all time.

2. SYMBOL—♆ A trident fashioned like the three-pointed harpoon of the Aegean fishermen. With this strange instrument, at once a weapon and a wand, he is said to have

shattered rocks and summoned or silenced the most terrific storms on land or sea.

3. MARKINGS—Because of the great distance and the small diameter, as well as the limits of our present instruments, no permanent features have yet been seen. It is green like Uranus.

4. LINEAR DIMENSIONS—The mean diameter is about 32,000 miles or a little over 4 times that of the earth and 1/27 of the sun. The circumference is about 100,000 miles. In their relative sizes Neptune and Uranus are more like twins than are the earth and Venus.

5. MASS—About 17 times the earth or nearly 102 sextillion tons.

6. DENSITY—1.3 times water or .236 of the earth and similar to the other large planets and the sun.

7. SURFACE GRAVITY—.98 of the earth and a little stronger than that of Uranus.

8. PERIOD OF ROTATION—According to the latest spectroscopic determination it is probably about 15 hrs. 48 min. so there are little less than 8 hours daylight and 8 hours darkness each Neptunian day, but the unusual angle of inclination stands it almost upside down and makes it appear to rotate in a backward direction. Its velocity is 1.76 miles per second or 6,330 miles per hour at its equator.

9. DAYS IN ITS YEAR—About 91,320 Neptunian days in each revolution, due to its speed of rotation and its great orbit or path.

10. OBLATENESS—Said to be .02 which is a very low ratio and if true would mean a small polar flattening and equatorial bulge.

11. INCLINATION, EQUATOR TO ORBIT—151° of arc. This is a very large obtuse angle which turns the planet nearly upside down and produces four seasons similar to those of the earth but exceedingly cold and each some 41 of our years long.

12. SOLAR RADIATION—About .0011 or 1/900 of the amount we receive per unit area and equal to only about as much light as we might get from 500 full moons. Sunlight reflected from Neptune reaches us in about 4.25 hours but light from the nearest star, Alpha of the Centaur, takes about 4.25 years.

13. TEMPERATURE—At the surface it is said to be about —364°F. but as in the case of some of the other outer planets, the lack of solar heat may be made up from internal supplies.

14. ATMOSPHERE—The spectrum shows bands similar to those of the other larger planets but stronger.

15. DISTANCE FROM EARTH—Mean about 2,782,700,000 miles. At nearest opposition it is about 2,651,800,000 miles and at farthest conjunction about 2,933,700,000 miles.

16. DISTANCE FROM SUN—Mean about 2,782,700,000 miles. At perihelion it is about 2,744,700,000 miles and at aphelion about 2,840,700,000 miles.

17. DIMENSIONS OF ORBIT—The mean diameter of the plane orbit is said to be about 5,565,400,000 miles and the circumference about 17,555,000,000 miles but the real path is an exceedingly open helix.

18. HELICAL PATH—In this continuous helical journey along with the sun Neptune traverses, during each revolution of about 165 of our years or one Neptunian year, some 67,820,000,000 miles or about 50,265,000,000 miles more than are given for its plane orbit. These greater distances require higher speed.

19. PERIOD OF REVOLUTION, SIDEREAL—164.78 of our years. This is nearly twice as long as Uranus and almost 14 times that of Jupiter. Neptune has covered only a little more than half its orbit since it was discovered in 1846. Its syndonic period is 367.5 of our days.

20. VELOCITY OF REVOLUTION—In the plane orbit it is given as 3.4 miles per second or 12,200 miles per hour but its real helical path it is about 12.9 miles per second, or 46,400 miles per hour.

21. ECCENTRICITY OF ORBIT—.0085. The sun is thus out of centre about 48,000,000 miles making a difference of 96,000,000 miles between perihelion and aphelion distances. This is very small compared to the size of the orbit which is therefore almost circular and the seasons will not be affected by the very slight variation of sunlight.

22. INCLINATION, ORBIT TO ECLIPTIC—1°47′ of arc. The orbit is quite close to the plane of the ecliptic.

23. LONGITUDE OF PERIHELION—About 44°. Aphelion is opposite.

24. ELONGATION—As remarked above, this is the angular distance of a planet from the sun as seen by us but for the outer planets it is usually expressed in terms of the three following items.

25. CONJUNCTIONS—Those with the sun are unimportant for us because of the planet's great distance. They occur

every 367.5 days or just about annually. Conjunctions may also take place with the moon and the other planets.

26. QUADRATURE—This occurs twice each year, one east and the other west of the sun and at right angles to a line joining the earth and the sun.

27. OPPOSITION—This occurs when we pass between the sun and the planet every 367.5 days and therefore about two days later each time.

28. PHASES—These are of no importance to us because of the planet's distance.

29. SATELLITES—Neptune, like the earth, has but one moon, Triton, thus far discovered and this was found by Lassell within a month after the discovery of the planet. Its orbit is almost circular with a radius of 220,000 miles and a period of 5 dys. 21 hrs. 2 min. The inclination of its orbit to that of its primary is about 145° and it revolves in a backward direction. Its magnitude is between 13 and 14, its mass about half that of Mars and its diameter about the same as that of our moon.

30. ECLIPSES—These, like some of the other items, are very rare and unimportant for us because of the distance and the angle of the orbit of the satellite.

CHAPTER XIV

PLUTO.

1. NAME—Among the Greeks his name was Dis, the god of the under-world. The Romans called him Pluto, the ruler of Tartarus and brother of Jupiter and Neptune. The new planet's probable position and orbit were calculated more than thirty years ago by Percival Lowell at his observatory near Flagstaff, Arizona. Following these calculations, a diligent search was made both of the sky and photographic plates until it was found not far from the star Delta of Gemini in March, 1930. The name suggested by a child in England, seems very appropriate and its letters are here proposed as the first letters of Percival Lowell, unusual telescopic observer. The name must not be confused with Plutus, the god of wealth.

2. SYMBOL—The original was a curious cap given to him by the Cyclops with which he could make himself invisible at any time. This does not lend itself very well to astronomical symbolism so we suggested that the permanent symbol be a circle surrounding the X which designated it before it was named. This unfortunately was not done but a mere diagraph has been

SOME SOLAR SYSTEM DATA

forced upon it; a procedure disallowed for Herschel the actual discoverer of Uranus.

3. MARKINGS—Thus far no markings have been seen and we may not expect to discover any until much better instruments are available.

4. LINEAR DIMENSIONS—From the determinations made in 1943 the diameter is said to be much the same as that of Venus or about 7,000 miles.

5. MASS—It is estimated as similar to that of Venus or 1/400,000 of our sun.

6. DENSITY—Estimated at about 4 times that of water or a little less than the earth's.

7. SURFACE GRAVITY—Probably slightly more than 4/5 of that of the earth.

8. PERIOD OF ROTATION—Possibly about 20 hours but this is only a guess. Its velocity is therefore unknown.

9. DAYS IN ITS YEAR—As yet unknown.

10. OBLATENESS—Possibly similar to the earth but we must wait for the facts.

11. INCLINATION, EQUATOR TO ORBIT—Unknown.

12. SOLAR RADIATION—This is only about 1/1,600 of the amount we receive per unit area.

13. TEMPERATURE—At the surface it may be about —400°F.

14. ATMOSPHERE—Since it is yellow and has a low albedo, its atmosphere may be rare like that of Mars.

15. DISTANCE FROM EARTH—Mean about 3,666,000,000 miles. At nearest opposition it is 2,717,000,000 miles and at farthest conjunction 4,843,000,000 miles.

16. DISTANCE FROM SUN—Mean 3,666,000,000 miles. At Perihelion it is about 2,810,000,000 miles and at aphelion 4,750,000,000 miles. This is about 40 times that of the earth and a little more than 100 times that of Mercury.

17. DIMENSIONS OF ORBIT—The mean diameter of its plane orbit is said to be about 7,560,000,000 miles and its circumference about 23,760,000,000 miles but the actual path is an enormously open helix almost approaching a straight line.

18. HELICAL PATH—In this continuous helical journey with the sun Pluto traverses, during each revolution of about 248 of our years or one Plutonian year, some 101,422,000,000 miles of about 77,660,000,000 miles more than are given for its plane orbit. This requires higher speed than given for the plane orbit.

19. PERIOD OF REVOLUTION, SIDEREAL—248 of our years. Two revolutions of Pluto almost equal three of Neptune. They were quite close to each other in 1892 but since that Neptune has been steadily leaving Pluto behind and will not catch up with it again for 486 years. Pluto's synodic period is about one of our years.

20. VELOCITY OF REVOLUTION—In the plane orbit it is given as about 3 miles per second or 10,800 miles per hour but the velocity in its real helical path is about 12.8 miles per second. This is only 1/5 of a mile per second faster than the sun.

21. ECCENTRICITY OF ORBIT—.25. This is the greatest for all the planets. The sun is thus out of centre 945,000,000 miles, making a difference of about 1,890,000,000 miles between perihelion and aphelion distances. At perihelion the orbit lies within that of Neptune but the angle of inclination is so great that Neptune cannot crash into Pluto and really passes quietly about 240,000,000 miles beneath it.

22. INCLINATION, ORBIT TO ECLIPTIC—17°9′ of arc. This is the greatest of all and is the angle which prevents any collisions.

23. LONGITUDE OF PERIHELION—About 223°34′ Aphelion is opposite.

24. ELONGATION—See 25.

25. CONJUNCTIONS—Those with the sun are not important. At the somewhat recent rather distant conjunction with Neptune they were about 1,765,000,000 miles apart. The last close conjunction occurred about 10,000 years ago and the next will take place in about 30,000 years. Conjunctions also occur with the moon and the other planets.

26. QUADRATURE—As with the other planets.

27. OPPOSITION—As with the other planets.

28. PHASES—They are of very little interest.

29. SATELLITES—None yet discovered.

30. ECLIPSES—Of no particular interest.

NOTE—Watch for further information.

SOME SOLAR SYSTEM DATA

CHAPTER XV.

COMETS AND METEORS

As in the case of the planetoids, we shall not follow the numbered items closely but only as our information requires.

COMETS.

These differ in many ways from the planets and one should hardly think of associating them but for the fact that they also revolve around the sun in definite periods. Whatever they are when far out in space, we call them Comets when they have been captured by the sun and made to travel around it. On their way in or out many have been affected by the attraction of the outer planets and made to trace shorter elliptical paths whose aphelia are not far from the planet's orbit. The general name comes from coma, meaning hair, while the special names are given to them according to the year and the discoverer's name, although the computer's name sometimes takes the place of the latter, as in the case of Halley and Encke. When the orbits have been fully determined they receive their final number and a letter to differentiate them from others of the same year. In 1925 eleven were designated in these ways and it was a record. About 1,000 have been found and designated. 13 were found in 1932.

Their colour is usually yellowish but occasionally a greenish tint is seen in their tails.

On close examination the head appears to be composed of a nucleus with a surrounding envelope of illuminated gas which is sometimes in layers. Their structure seems to be a loosely compacted mass of meteoric matter, the lighter particles of which are transformed into a tail by radiant repulsion when they approach the sun. The nucleus may also change its arrangement at that time.

Comets have unusual dimensions. The diameters of the heads vary from a few miles to hundreds of thousands of miles and some have even reached the million mark. The nuclei are also extensive, ranging from a few miles to the size of the earth.

The tails are exceedingly extensive and grow from hundreds to millions of miles in width while their length has been known to reach over one hundred million miles and nearly always in the direction away from the sun. Some of the smaller ones have had no tails at all and occasionally small tails are attracted toward the sun.

The masses are very small and no perturbations caused by them have been measurable. The appreciable densities pertain to the nuclei alone as no matter how large the tails they never diminish the visibility of the stars beyond them. In 1910

Halley's comet transited the sun and, although we had to look lengthwise through the tail, head and nucleus, nothing of it could be seen.

Their light is mainly reflected sunlight but the nucleus may possess some light of its own.

The eccentricity of their orbitis is usually very great, and their perihelion distances vary from about 465,000 to 375,000,000 miles but few exceed 140,000,000 miles.

Their inclinations are at many angles although some are in groups at very similar angles and may be parts of a former larger comet broken up by many visits to the sun. A few have been known to do so and disappear perhaps to become meteors.

Their average velocity of revolution varies from 300 to 400 miles per second and their speed at perhelion is naturally very high.

Their sidereal periods vary from about 3 years to as much as 10,000 years. Some may never return.

Three comets have been called great. The first appeared in 1744 with two tails and then gradually developed six. The second in 1811 with a tail 15,000,000 miles in diameter and 100,000,000 miles in length. It was visible from March to August of the next year and its period was said to be about 3,000 years while its aphelion distance was given as 14 times that of Neptune. The third appeared in 1843 and was remarkable for its close approach to the sun, which was only 500,000 miles. Its tail was 2,500,000 miles wide and 164,000,000 miles long. The writer clearly remembers his childish delight and wonder at seeing the very large comet of 1882.

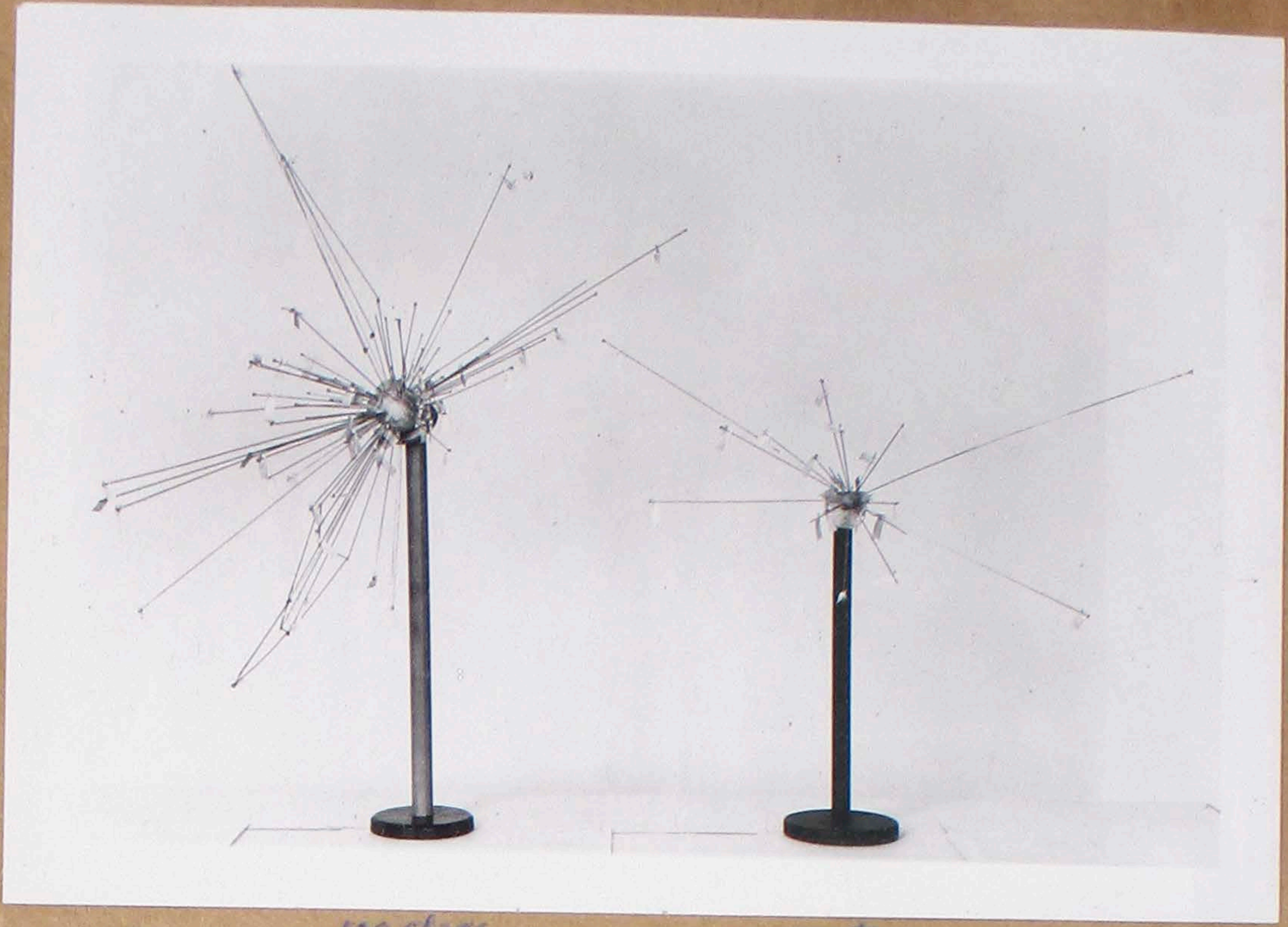
In 1943 Whipple's comet was visible to the unaided eye for a few days.

METEORS.

These are undoubtedly residual cosmic matter that was not included in any of the planets and, like the planetoids, was divided and forced into the present orbits by the powerful attraction of the larger planets. Their number is probably inconceivable and we are told that the earth is passing through a constant rain of them amounting to many millions each day. Most of them cannot be seen with the naked eye and many small ones streak the camera plates set up for other work. They vary in size from mere specks that flash for only a moment to those which weigh several tons and produce long brilliant paths through the air when they plunge to earth and become meteorites.

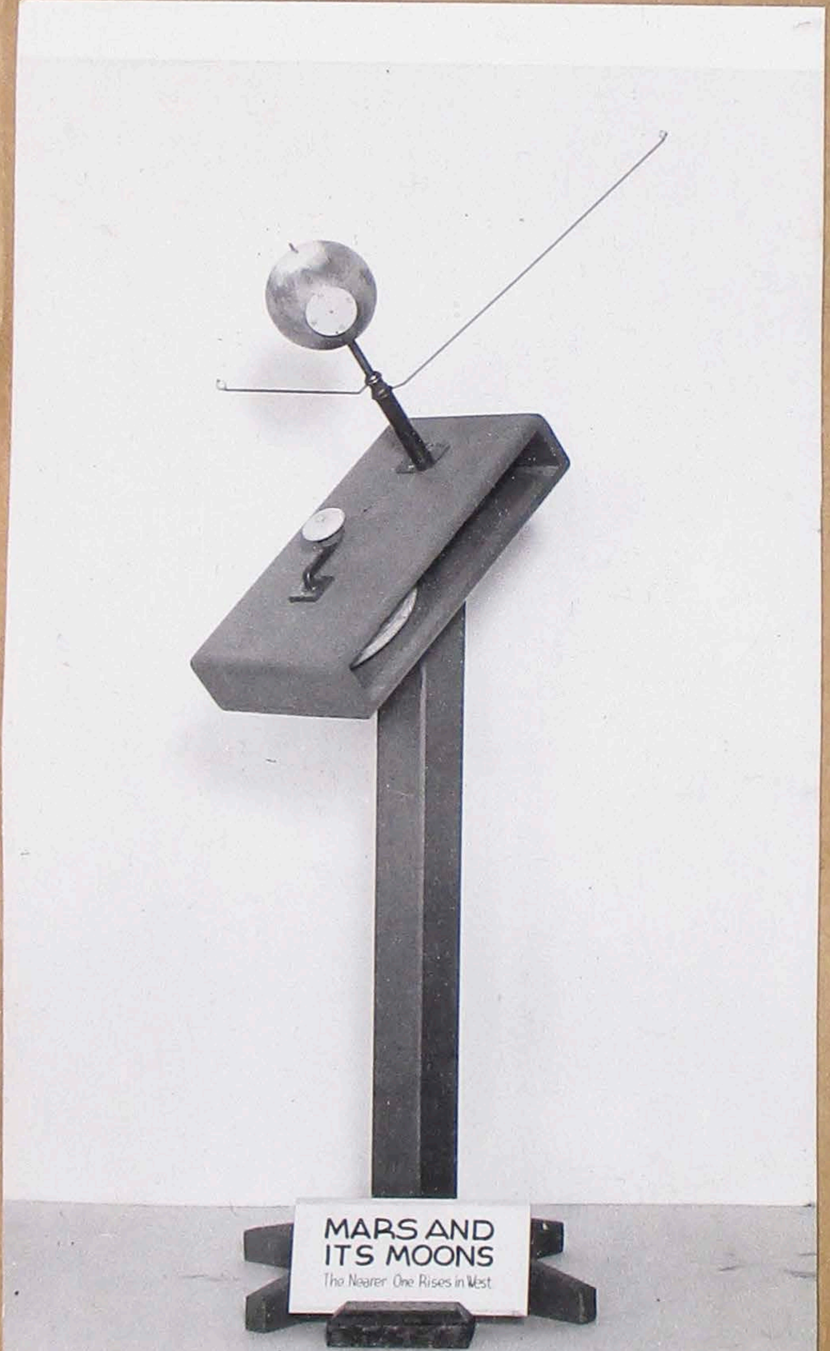
The best displays may be seen at special times according to their positions in their orbits with reference to the earth.

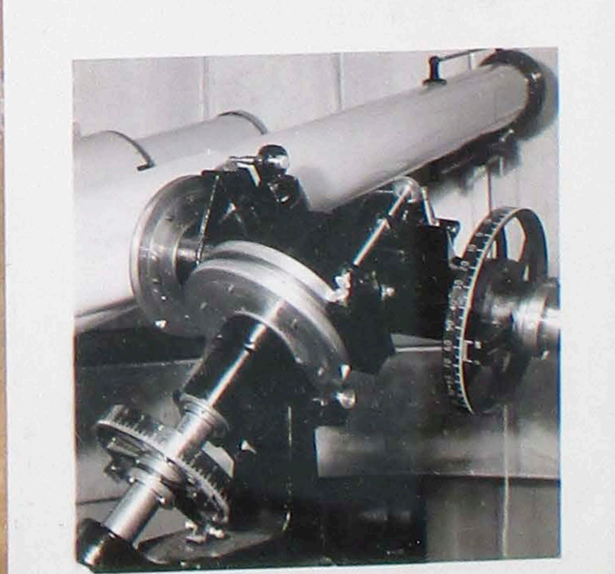
SOME SOLAR SYSTEM DATA



100 stars

30 stars





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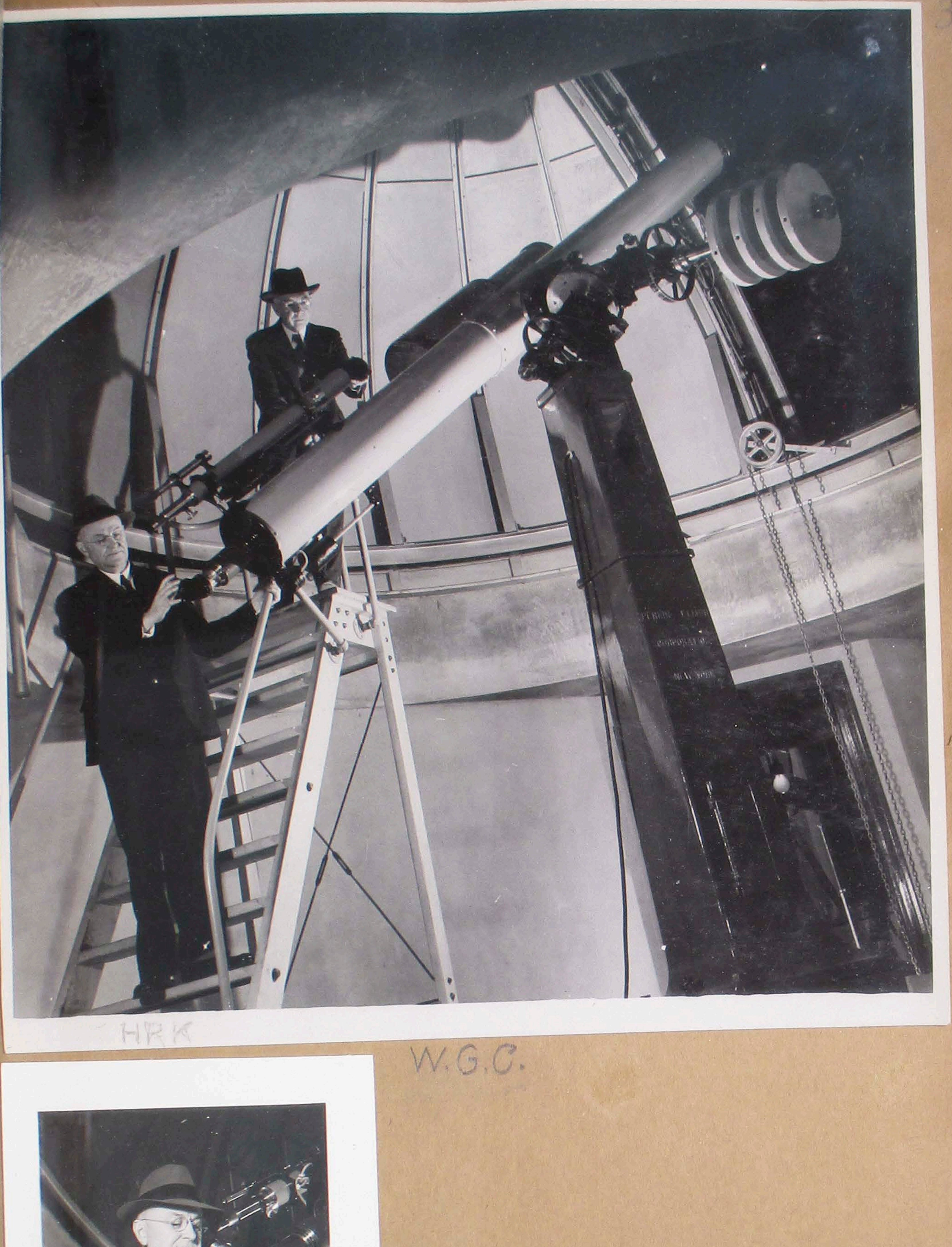
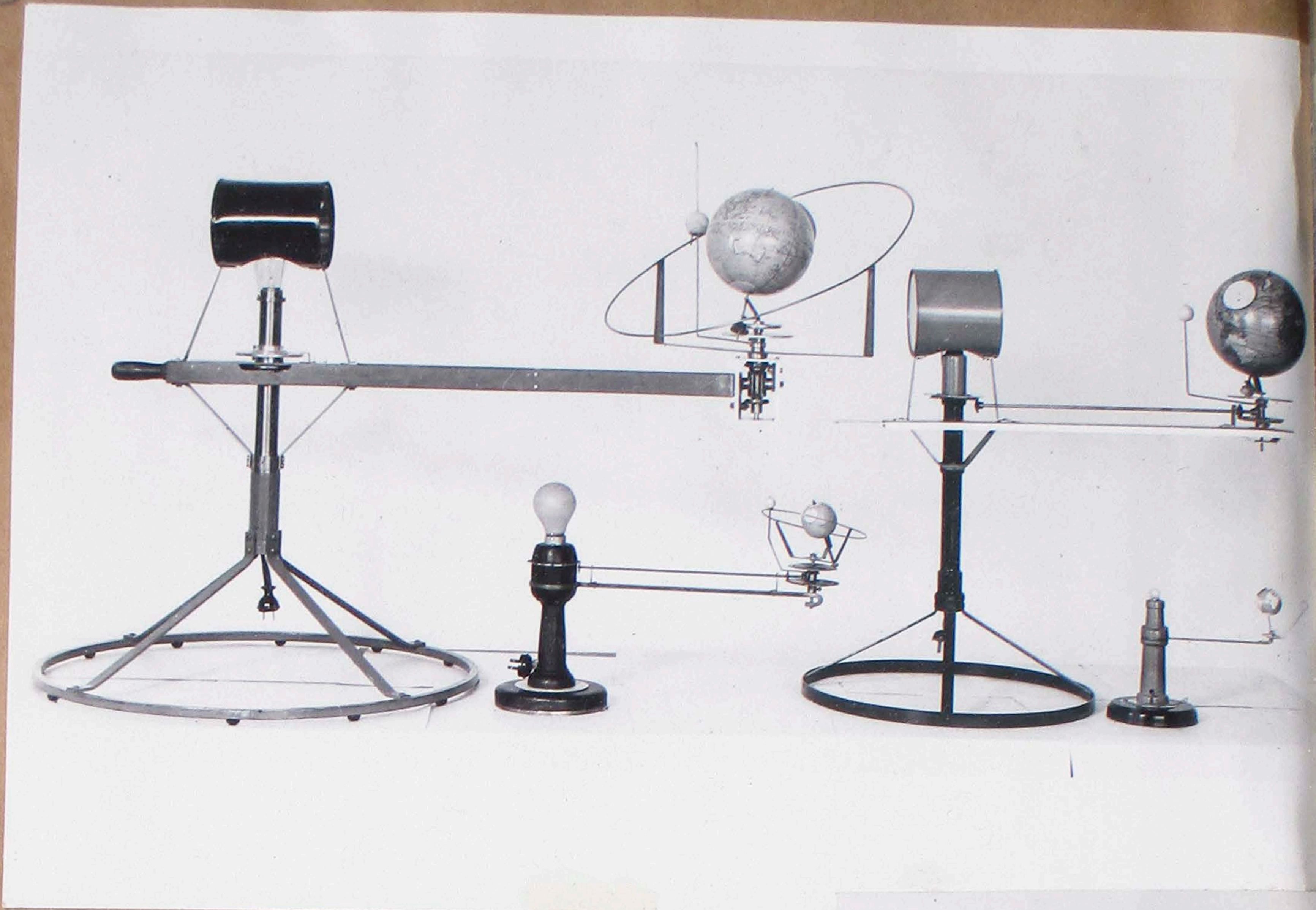


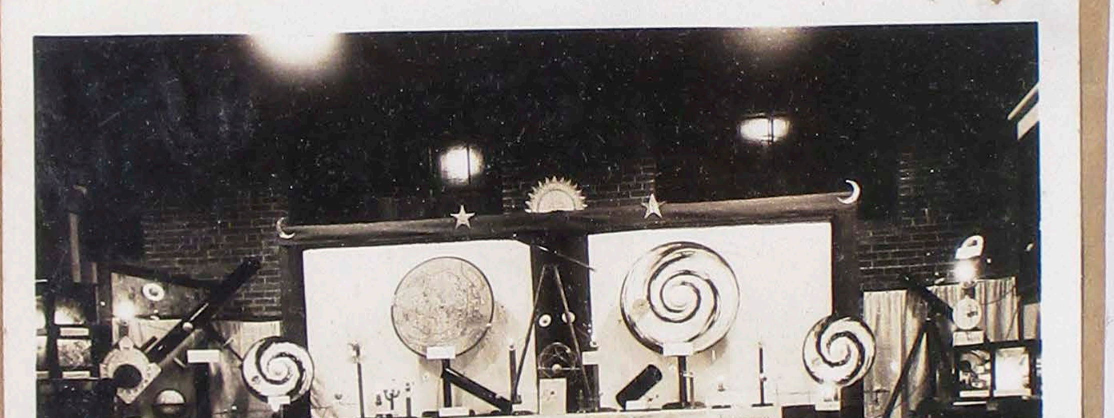
HRK

W.G.C.

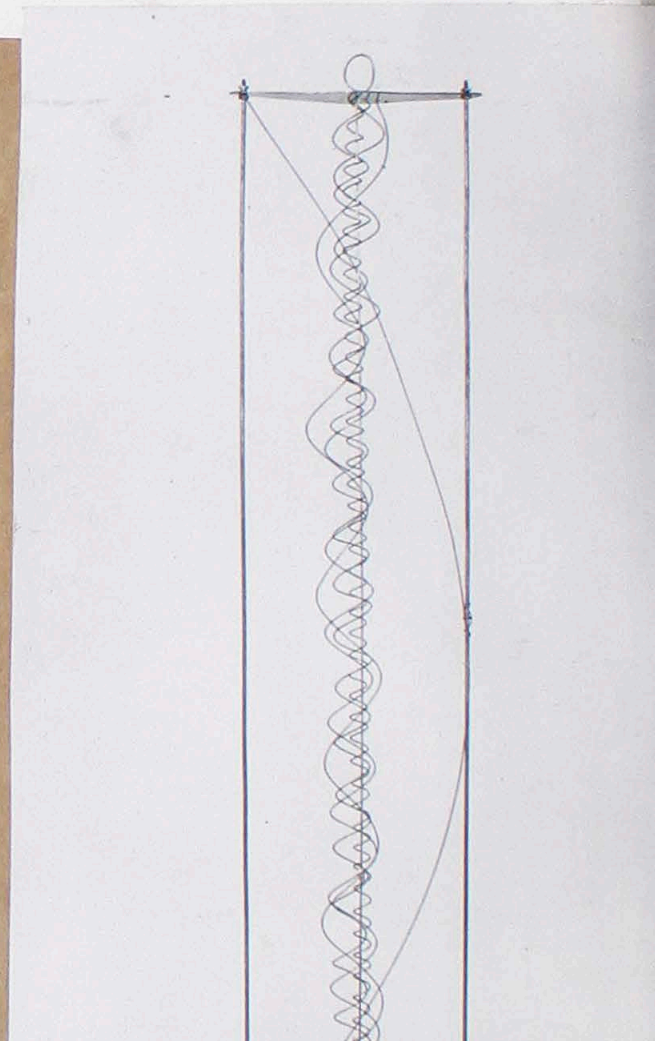
H.R.K.

THE SOTELLUNIUM FAMILY





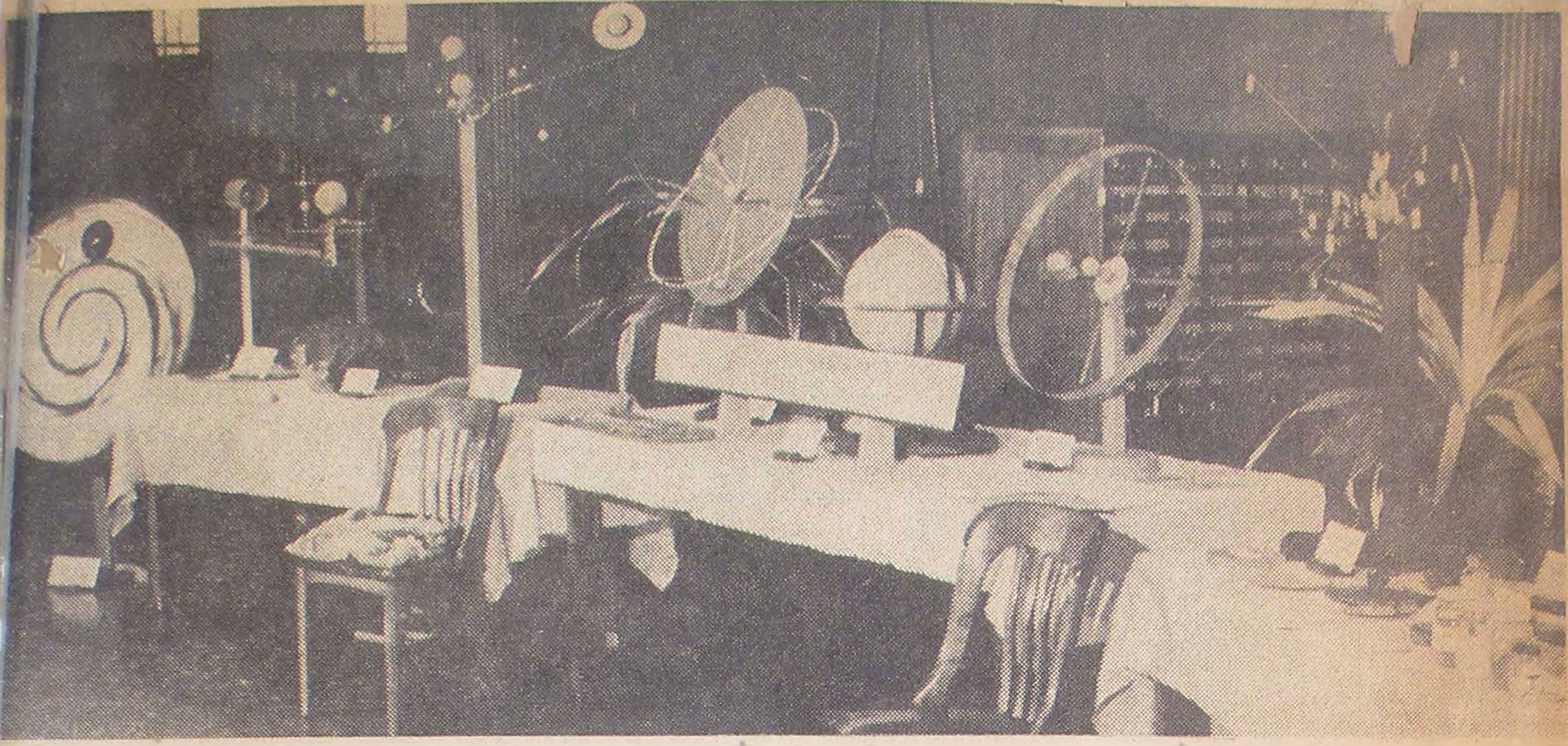
Mr Colgrove's own astronomical exhibit at the Western Fair 1936.



The paths of the Planets →
Mercury, Venus, Earth,
Mars and Jupiter.

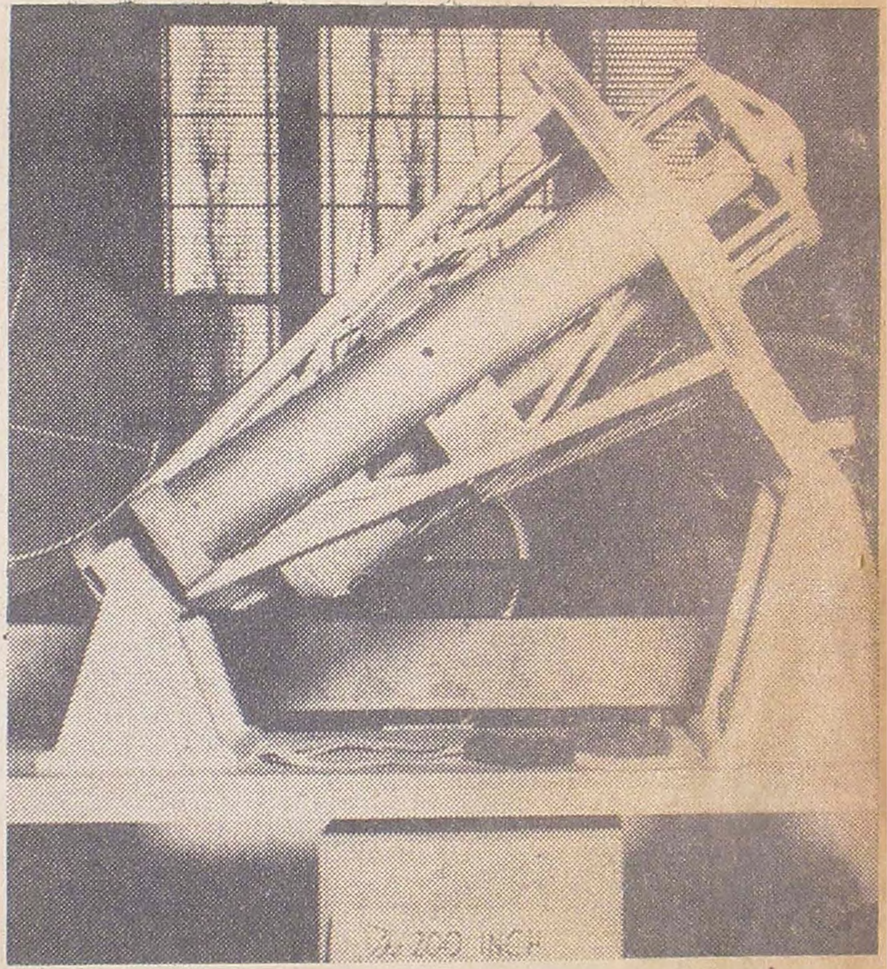
London Free Press, April 18-25, 1952.

Astronomical Gear Displayed at London Library



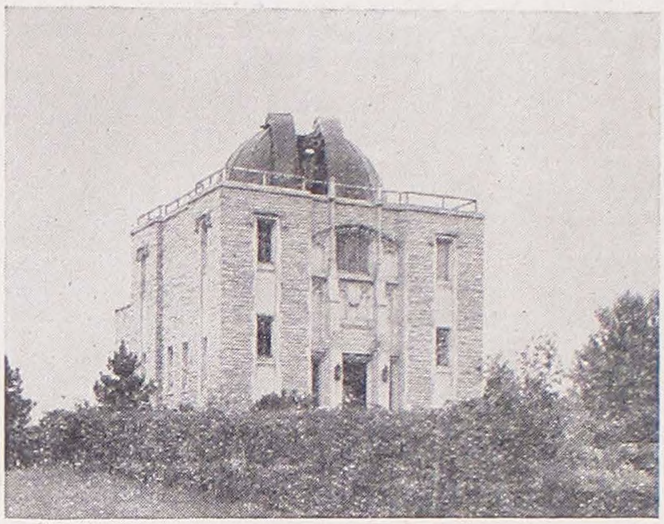
arth, sun and the rest of the universe have been reduced to a collection of wooden balls, wires and light bulbs in this isplay of astronomical equipment at the London Public Library. Most of the demonstration pieces were made by the Rev. W. G. Colgrove, and many are used at University of Western Ontario.

Mr. Colgrove gives a few pointers on this aid to astronomy, called a "planetzodiac." He made it.



Scaled model made by Mr. Colgrove of the 200-inch telescope, largest in the world, at Mount Palomar, Cal.

360



The Hume Cronyn Memorial Observatory
University of Western Ontario
London, Canada

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INVENTIONS
XI

THE LONDON FREE PRESS, Tuesday, December 23, 1952—2

Blind May Use Londoner's Idea

Cemetery.

Sis looks like any tomboy — but
You'll find her gay young heart
Longs for some "EVENING IN PARIS"
That's where her bright dreams start!

Julius Rosenburg in New York for espionage.

More than 250 persons heard speakers attack the severity of the sentence and urge that they join in a "last-chance" appeal to President Truman.

The Rev. Keith Woollard, of St. John's United Church referred to "war hysteria" and condemned the

Get Probation

Two boys were placed on probation and two others received suspended sentences yesterday in juvenile court after all pleaded guilty to theft of scrap copper wire, the property of J. V. McDonnell Electrical Construction Company Ltd

June Stars 2.

The fourth group is CORONA BOREALIS (short o long o short a;o,e,a,l short i)the Northern Crown. This is a small constellation and has but one bri star called Gemma which is of second magnitude and 60 light years away. There are several doubles here and some strange variables especially the one called the Blaze Star which flared up seven magnitudes and then sank out of sight.

The fifth group is part of the shoe-string constellation SERPENS whi has no bright stars but boasts of several fine doubles and a great globular c cluster marked by a small circle of dots.

The sixth group is part of Virgo where we see only her feet with no important stars.

The seventh group is LIBRA(long i short a) the Balances which lie on the ecliptic circle and has only two bright stars. No.1. is Kiffa South which of third magnitude,is 58 light years away and is coming at about 6 miles per second. It has a small companion. No.2. is Kiffa North which is also of third magnitude,is 217 light years distant and coming at about 22 miles per second. It is the only naked-eye star with a decidedly green color.

The remainder of our map is too low in the southern haze for good seeing so we shall turn to some interesting phenomena outside.

NOTE-- Mercury is now an evening planet which every reader should endeavour to observe in the western sky a short time after sunset. On account of its greater speed than ours it will gradually move in between us and the sun c the 23rd. and be at inferior conjunction with the sun after which it will bec a morning planet.

Venus is still a very brilliant object which no one can miss and ever one should watch each night because it too is gradually moving in between us a the sun and will be at inferior conjunction with the sun only a few hours afte Mercury. They will be invisible for a short time and then she willfollow him o into the morning sky.

Mars is still apparently near Regulus but steadily moving eastward an leaving Saturn in the west while we are traveling faster and leaving both behi

Jupiter rises in the southeast and reaches the meridan shortly after midnight but is rather low for good seeing.

Saturn is still high and west of Mars and makes a fine object in the telescope. Be sure to see it now because it will soon pass below the horizon a not be visible in the evening sky until December.

W.G.Colgrove.

La-Ti-Do in Color May Bring Do-Re-Mi

July 22'48

Londoner Invents Piano With No Noise - -Lots of Light

MAYBE George Gershwin's immortal "Rhapsody in Blue" is really green or a delicate tint of pink.

If it is masquerading under false colors, Rev. W. G. Colgrove has developed a "prismatic piano" to reveal the truth.

Rev. Mr. Colgrove, who has invented most everything except the better mousetrap, says his piano is soundless. It transposes music into light and different notes produce all the colors of the rainbow.

* * *

You see the music instead of hearing it, which, when little Willie is practising his scales, is a decided advantage.

Already a novelty company has called to try out a little swing in technicolor. It may buy the machine for further development.

The piano consists of a keyboard of 12 notes, each of which is coupled to a 15 watt colored light bulb. When the note is "played" the bulb flashes on a screen.

* * *

It sounds simple and not very interesting, but actually it opens up all kinds of possibilities.

It might be used in conjunction with dance orchestras, couples dancing "in time" to colors flashing across the ceiling. A theatre organ playing intermission music would simultaneously illuminate the curtain with appropriate changing colors. Store windows at night would attract crowds with a few light tunes, and deaf people would watch whole symphonies of color. Choirs, with which accompanying instrumental music was not desired, would be "led" by color notes.

The colors have a definite scientific relationship with the notes they represent.

* * *

Sound is formed by vibrations which amble along at the relatively slow speed of 1,100 feet per second, explained Rev. Mr. Colgrove. Light, a cousin of sound, is much more speedy. It gets around at a billion feet a second. But there is a certain distant relationship, because certain notes are just one trillion times slower in vibration than the light waves of certain colors.

In the "prismatic piano" C above middle C which vibrates at 522 a second, is represented by the color yellow, which vibrates at 590 trillion a second. Blue, which vibrates 700 trillion times a second, represents the note E, which on a normal piano, vibrates 675 times a second. The note G (795 vibrations a second) is represented by violet (800 trillion vibrations a second).

* * *

Thus, the color scale could also be used to teach science students the relationship between sound and light.

Sharps and flats, for music purposes would be added in the form of color half-tones.

It even begins to appear that composers may begin writing music in color, but it isn't known yet whether the national anthem comes out red, white and blue.

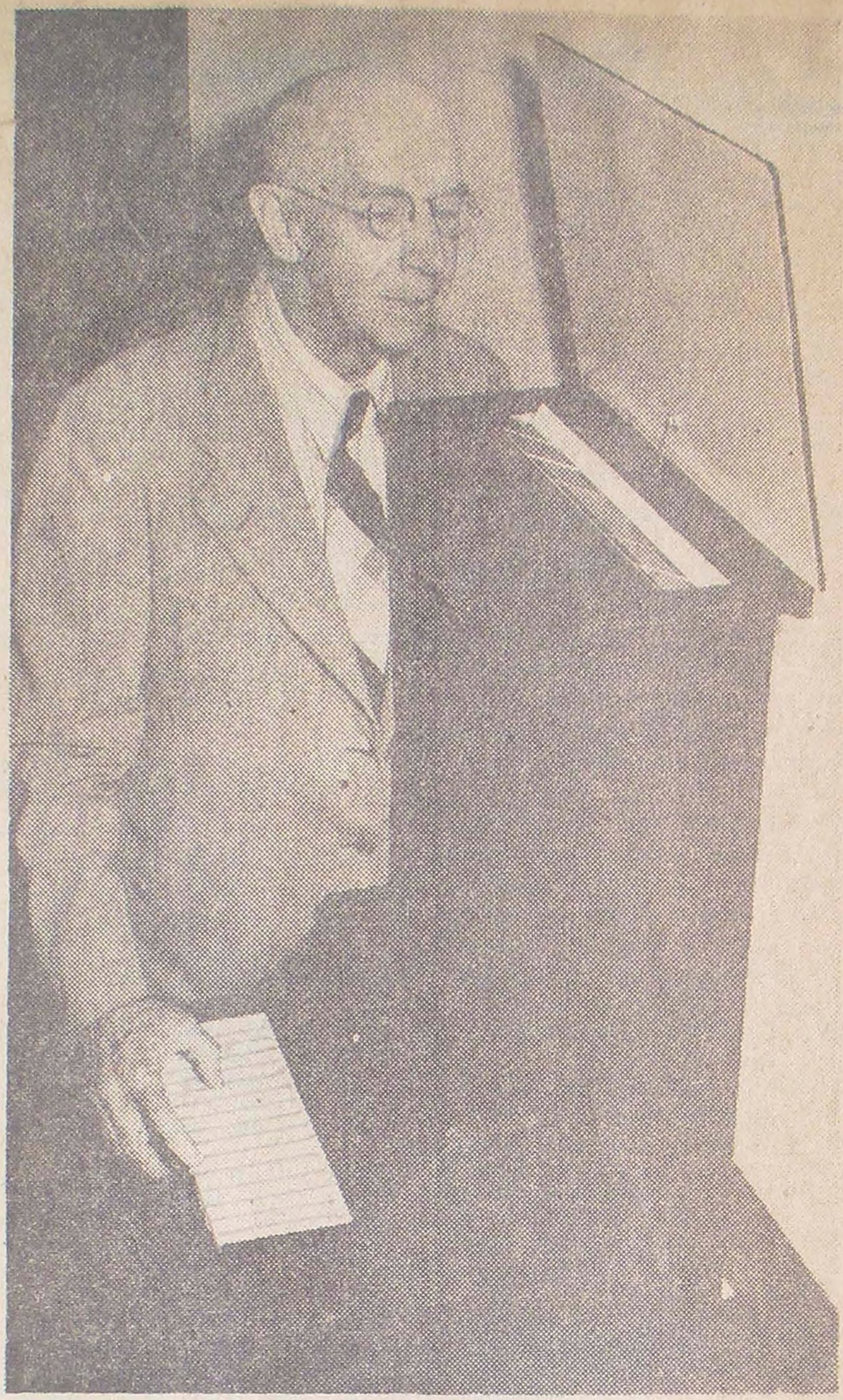
* * *

Rev. Mr. Colgrove, who is a public lecturer at the University of Western Ontario, and 76 years old, has invented astronomical equipment which is in use in many universities of North America, mechanical puzzles to help veterans taking occupational therapy treatment, and dozens of other unexpected devices.

At the time the Wright brothers were building the first airplane, Rev. Mr. Colgrove and his brother were experimenting unsuccessfully with the same idea. They were flying gliders around the hills north of London.

After the Wright brothers conquered the flying problem, the Colgroves became facetiously known to London friends as "the Wrong brothers."

Perhaps not quite so important as the conquest of flying, it looks as though Mr. Colgrove has made a significant contribution to the progress of the human race, for now little Willie can practice his scales in the blessed silence of light.



"Silent" music can be "played" on this experimental piano built by Rev W. G. Colgrove who says his idea can be extended to a regular piano keyboard.

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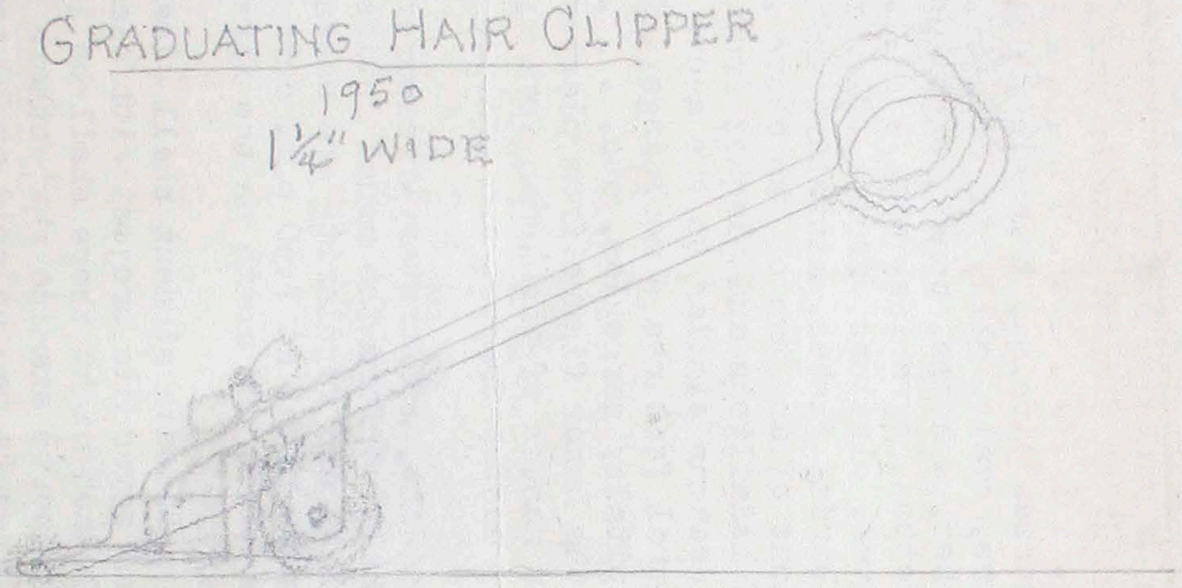
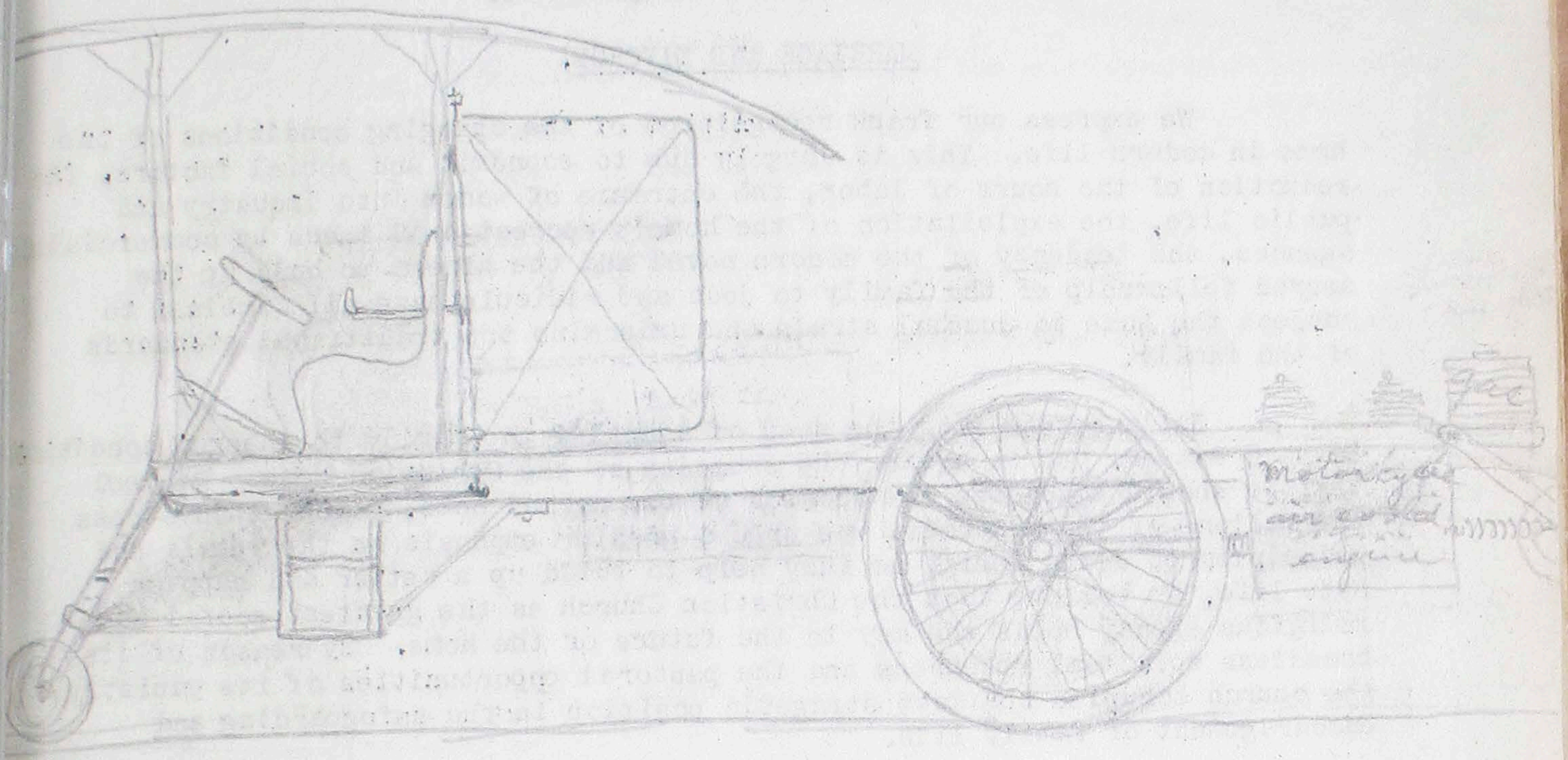
GRADUATING HAIR CLIPPER
1950
1¼" WIDE



The Turtledove

Aug. 1, 1930



We recommend that this Conference view with thankfulness every movement throughout the world toward international peace and good will. It recognizes such movements as evidences of the Spirit of Brotherhood among the members of the human family.

The Conference would commend the work of the League of Nations to the sympathy, prayers and active cooperation of its ministers and people and would urge that ministers should acquaint their people concerning the effort being made by various nations towards peaceful arbitration in all national disputes.

That the Conference grant permission to the Standing Committee of Evangelism and Social to meet in the early autumn.

MARRIAGE AND DIVORCE.

We express our frank recognition of the changing conditions of the home in modern life. This is largely due to economic and social factors. The reduction of the hours of labor, the entrance of women into industry and public life, the exploitation of the home's recreational needs by commercialize agences, the tendency of the modern novel and the cinema to hold up the sacred fellowship of the family to jest and ridicule have all combined to subject the home to unusual strain and undermine the traditional standards of the family,

Fully recognizing the need of adapting the family to changed condition to some extent, yet we affirm the sanctity of the Christian home. We feel that we should emphasize the success of the normal home, rather than stress the failure of the abnormal. We urge a greater emphasis on the ideals and principles of Jesus Christ as they help to build up a better and happier home life. We believe that the Christian Church as the greatest social and religious agency holds the key to the future of the home. By reason of its boundless spiritual resources and the pastoral opportunities of its ministry, the church occupies the most stragetic position in the safeguarding and encouragement of family life.

In view of the fact that divorce is increasing in Canada to an alarming degree, and the Christian idealsof home and the relationship between man andwoman are being challenged, we think the time is opportune for the United Church to express its interpretation of the teachings of Jesus on these problems.

This Conference affirms our Lord's standards of marriage. We consider marriage as a divine institution, established from the beginning of society, for the honour and happiness of humanity, in which one man and one woman are united in holy wedlock, pledging each to the other, in love, honor and fidelity, as long as both shall live; that the twain become one flesh through the divine law, and what God hath joined together let no man put asunder. The object of marriage is the perpetuating of the family life, and the propogation of the race.

In view of the prevailing laxity and lowering of morals in this regard, and the increasing demand for divorce and provincial divorce courts, the United Church reasserts the traditional attitude of the great Christian Churches on this question, and sets its face resolutely against the evils of divorce, and the evils resulting from the re-marriage of divorced persons.

Y OF ARTS
T OF MATHEMATICS
ASTRONOMY

THE UNIVERSITY OF WESTERN ONTARIO
LONDON, CANADA

Jan 25, 1932

Dear Mr. Colgrove:

On Friday Nov 11, 1932, there will be presented before the London Centre of the Royal Astronomical Society a Symposium on the Telescope. Mr. F. H. Coates will demonstrate the optical theory of telescopes, and Mr. D. M. Hennigar will talk on the construction of a reflecting telescope. The Executive Committee has requested me to ask you if you would explain the construction of a refracting telescope and, if possible, give a demonstration in the use of the same. The Committee feels that these three topics, appearing on the program of the one evening, will have very great interest for the members of the London Centre. Will you kindly advise me as soon as possible if you can take part in this program?

With best wishes,

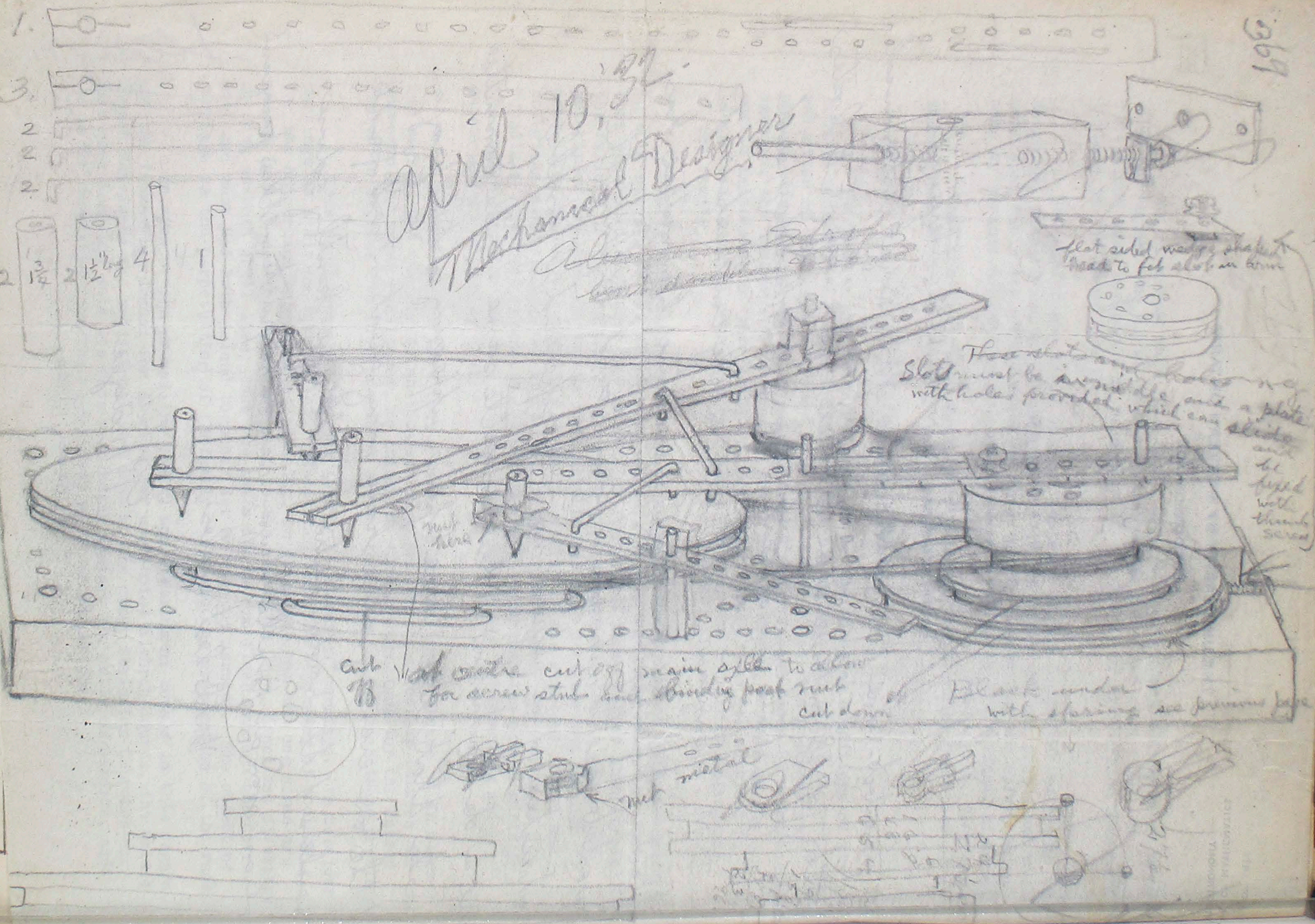
G R Magee

(Sec'y Treas.)

Declined

April 10, '37

Mechanical Designer


1.
3.
2
2
2
2 $1\frac{3}{4}$
2 $1\frac{1}{2}$ long
4
1
flat sided wedge shaped head to fit slot in arm
These slots are holes
Slot must be in middle and a plate with holes provided which can slide and be fixed with thumb screw
put here
Cut off
Cut at centre cut off main spindle to allow for screw stud and binding post nut
cut down
Block under with spring see previous page
metal
put

WALL ~~H O M E~~ BASE BALL GAME

V	S	O	S	O	S	O	S	O	V
IV	1	2	3	H	1	3	2	1	IV
III	O	S B V	O	P B IV	S B V	O	P B IV	O	III
II	3rd III	C F IV	P T V	L F III	1st V	R F III	2nd III	S S V	II
I	FOUL V	BALL if 4 to 1st	HIT II	STRIKE if 3 V	D.BALL to 1st	HIT II	STRIKE if 3 V	BUNT III	I

EXPLA~~I~~NATION

This indoor ball game is represented by abbreviations of terms in common use,and their copyrighted arrangement should be carefully studied before playing. The game is indicated in five rows of possible actions and requires considerable skill.

Row I shows the most popular plays and suggests the next row to be played.
Row II shows the direction of the ball and indicates the row to be played.
Row III shows what happened to the ball or the batter and gives the row to be played,unless the batter is out.
Row IV shows the number of bases obtained including H for home.
Row V shows whether the batter is safe or out.

The abbreviations are as follows:-- Row I explains itself. In row II 3rd.means third base; C F,centre field; P T,pitcher; L F,left field; 1st, first base; R F,right field; 2nd.second base; S S,short stop; In row III O means out; S B,stopped ball; P B,passed ball.

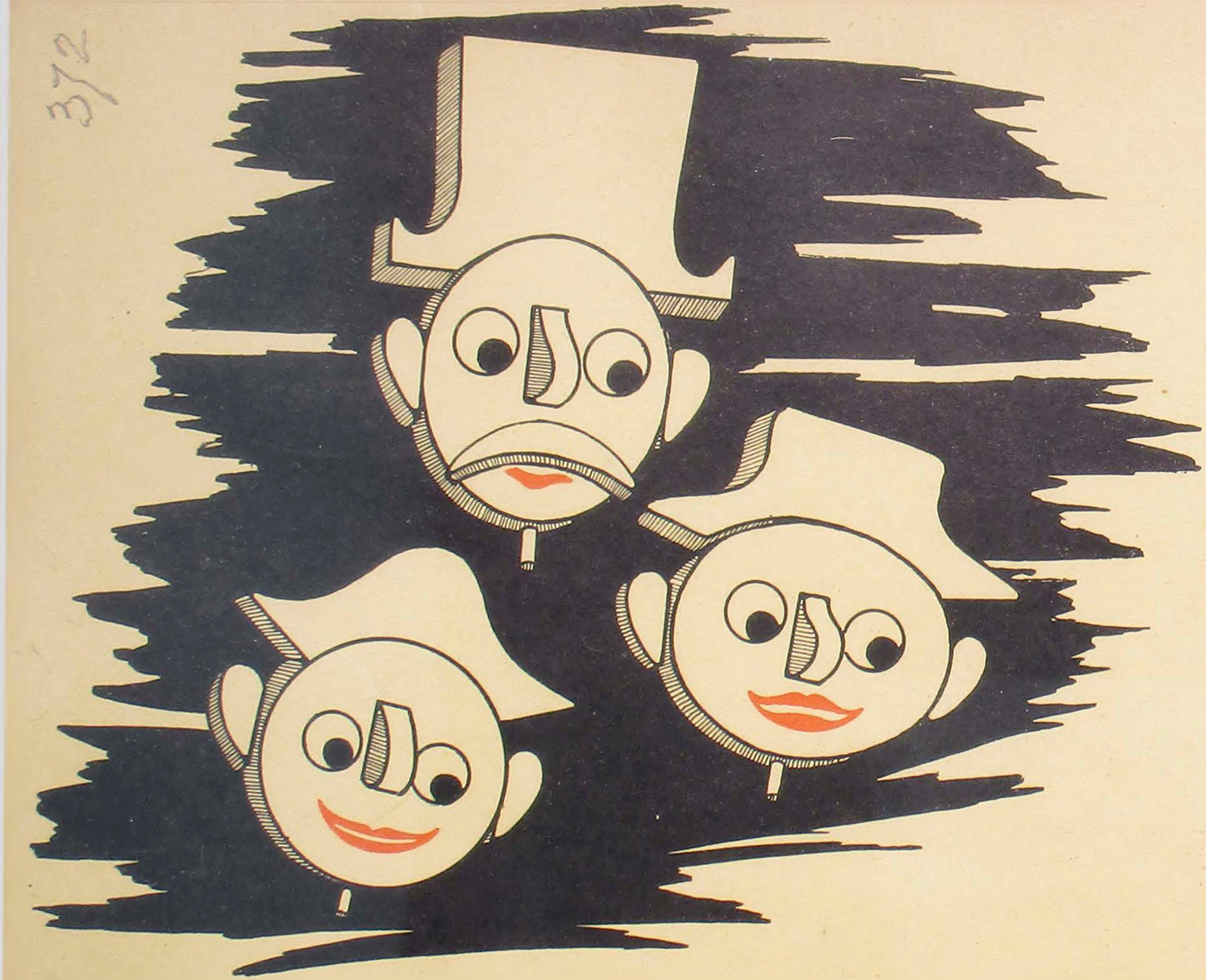
TO SET UP

Fix the chart on a wall with one-inch shingle nails. Attach the brackets to the wall just below the chart and one foot away at each end of the chart. Stretch the wire taut between them,with the ball already on it.

TO PLAY

Choose teams and seat them apart where all may see the plays and be ready. The leader of each team shall be its first player and keep its score. Move the ball to one end of the wire and strike it skilfully with the index finger to any selected play,then follow up as indicated. If a foul is safe it is counted a strike and ,unless it is 3,the player continues at bat. If a player wishes to try a steal he must say so and play V. The game may be played for prizes or for glory only. Any non-player who knows the game may be chosen as umpire.

model W.G.C.



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Free Advertising Material

373

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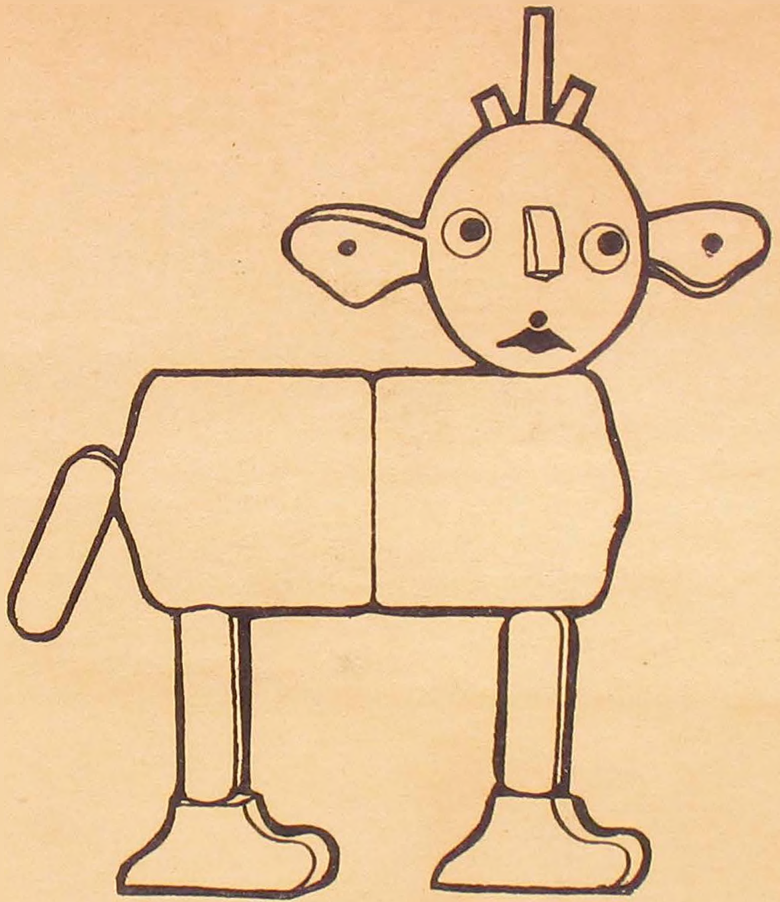

This is one of the Funny-Face Family's PETS— made from their interchangeable parts

SEE INSIDE

that is certain to make itself your BIG LEADER for quick and easy sales. It also will get you new, original, and unusually effective Selling helps FREE.

Fill in other side as directed, tear off, stamp and drop in the mail.

Remember that CASS TOYS "sell like sugar" — and the FUNNY FACE FAMILY is the newest, biggest sensation in the line!

ATHOL

Massachusetts

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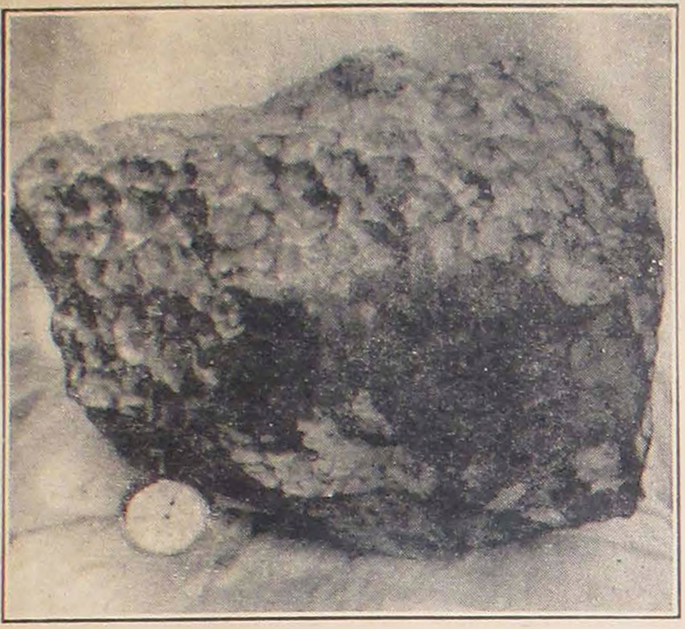
METEORS & COMETS

XII

THE DRESDEN METEORITE



This is the famous meteorite that was seen to fall near Dresden, Ont., on the evening of July 11, 1939. It was immediately recovered from a hole 5 feet deep and through the fine generosity of the Directors of the London Life Insurance Co. and the efforts of the writer was secured for and rests in the Hume Cronyn Memorial Observatory of the University of Western Ontario, at London, Ont.

THE DRESDEN METEORITE

Flashing like a blazing rocket,
Lighting all the countryside;
From the eastward it descended
Like a football glorified.

Sparkling as it fled to westward,
Thundering as it passed so near,
Gleaming brighter, ever brighter,
Bursting in the atmosphere.

We were standing on the campus
Wondering where it would alight,
Running, watching smoke and fire
Till it vanished from our sight.

Then we followed in the morning,
Found the place to which it flew,
Paid the price they wanted for it,
Brought it back to Western U.

METEOR PIECE GIVEN TO "U"

Presented by Morley McKay, Dresden Business Man

AUTHENTICITY IS ASSURED

Displayed to Large Crowd on Campus Last Night

Tourists from the United States probably have most of the fragments of the great meteor which exploded over Western Ontario, Tuesday evening, July 11, but the University of Western Ontario was presented with one of the best specimens yet turned up yesterday when Rev. W. G. Colgrove, lecturer in the department of astronomy, and Prof. G. H. Reavely, associate professor of geology, visited Dresden on a "Siderolite Scouting Tour."

The fine meteoric specimen obtained came from Morley McKay, prominent Dresden cafe chain owner, who refused an offer of $25 by a Detroit tourist yesterday. It weighs something over a pound.

The condition of this gift is that the university museum staff will cut it in half, polish one of the halves' surfaces, and return to him. The other half is his gift to the district's chief centre of higher learning.

Dr. Smith, at Dresden, was out of town, but, called by telephone, refused at this time either to sell or transfer his specimen, purchased by him for four dollars.

"We are very happy about the fine fragment given by Mr. McKay," Rev. Mr. Colgrove stated. "We are quite certain that it is a meteoric fragment and that it was part of the meteor which aroused such wide interest this past week.

"This specimen, seen by hundreds here tonight, shows a fuse surface, about one millimetre in thickness. The broken surface or fissures display the characteristic yellow points."

"We also found out in our scouting trip that American tourists have gone home with a large number of more or less authentic fragments of the recent spectacular meteor. This addition to Canada's tourist income will never be known, probably."

1947
~~The largest number of spots ever observed.~~

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CHAPTER XV.

COMETS AND METEORS.

By W.G.C.

As in the case of the planetoids, we shall not follow the numbered items closely but only as our information requires.

COMETS.

These differ in many ways from the planets and one should hardly think of associating them but for the fact that they also revolve round the sun in definite periods. Whatever they are when far out in space, we call them Comets when they have been captured by the sun and made to travel in long elliptical paths round it. On their way in or out many have been affected by the attraction of the outer planets and made to trace shorter elliptical paths whose aphelia are not far from the planet's orbit. The general name comes from coma, meaning hair, while the special names are given to them according to the year and the discoverer's name, although the computer's name sometimes takes the place of the latter, as in the case of Halley and Encke. When the orbit has been fully determined they receive their final number and a letter to differentiate them from others of the same year. In 1925 eleven were designated in these ways and it was a record. During almost any clear night with a good telescope one may see perhaps a dozen. About 1,000 have been found and designated.

Their colour is usually yellowish but occasionally a greenish tint is seen in their tails.

On close examination the head appears to be composed of a nucleus with a surrounding envelope of illuminated gas which is sometimes in layers. Their structure seems to be a loosely compacted mass of meteoric matter, the lighter particles of which are transformed into a tail by radiant repulsion when they approach the sun. The nucleus may also change its arrangement at that time.

Comets have unusual dimensions. The diameters of the heads vary from a few miles to hundreds of thousands of miles

Western Libraries acknowledges missing content from the original manuscript.

Pages 378-385 are missing from the scanned images of the manuscript.

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As in the c
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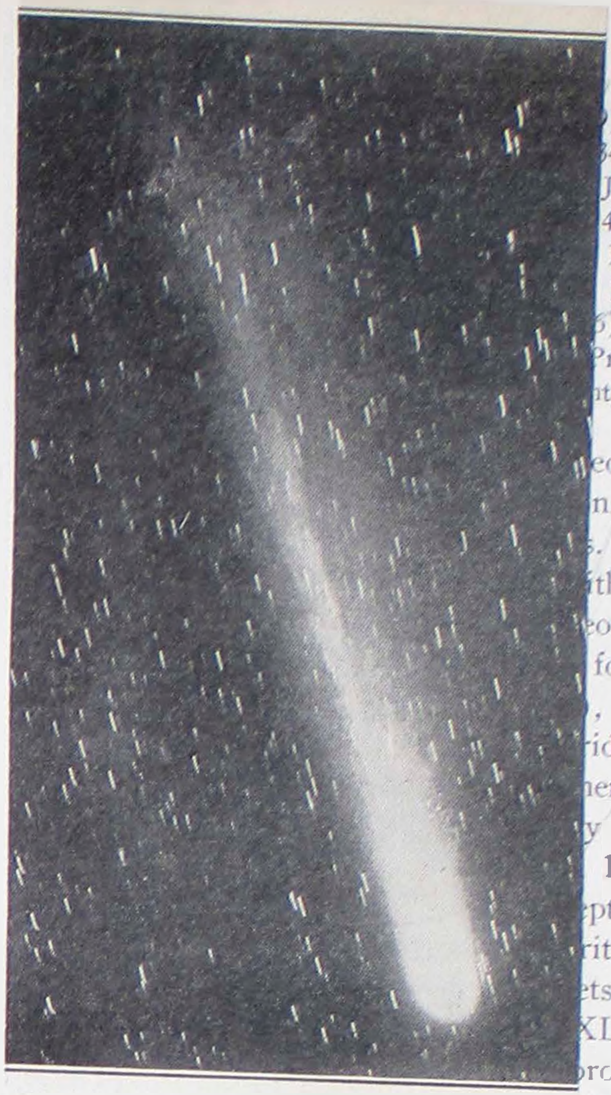
Seen by the author

Photo by the Auth
at U.W.D.



Halley's comet, May 29, 1910. *Photographed at the Yerkes Observatory.*

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Seen by the Author in 1882

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OBSERVATIONS

XIII

Sun Spots Predicting Colder Weather Here For Next Four Years

Weather Cycle Is Closely Related To Turbulence On Old Sol

PROFESSOR EXPLAINS

It is expected that for the next four years winters here will be colder, with more snow. This conclusion has been reached from the fact that for this period there will be more sun spots than there have been for the past eight years.

W. G. Colgrove, M.A., B.D., Chant Medalist of the Roy Astronomical Society of Ca ada, and instrument builder the Observatory of the Unive sity of Western Ontario, stat that according to the sun sp cycle "we are in for cold winter weather". The reas for this change in conditio and disturbances of magne instruments, including radi is that the ultra violet lig sent out by the disturbances the sun comes in contact w the upper atmosphere ~~surface of the earth~~ a disturbs the lower atmosphe

Cause of Spots

"Sun spots are evidently cau by chemical disturbance of sun's surface gases. Occasiona this turbulence seems to have a centre which bursts out with enormous energy and sents out great volumes of gases for hundreds of thousands of miles. Some is lost in space, the remainder returns to the sun. These explosions travel from 100 to 200 miles per second. The gas thrown off is mainly hydrogen gas. Practically all metals known on earth are in the form of gases on the sun," Mr. Colgrove asserted.

"These sun spots come and go in cycles with an average period of about 11 years. Today we are about three years up toward the peak with two years to go. Each month there will be an increase in the number of spots. These will run into the hundreds. For the four years following this there will be a decrease in the number down to none; that is none you can see through the telescope. The sun spots vary in size. Some have small openings approximately 100 miles across; others have vast caverns reaching 100,000 miles across the sun's surface.

Butterfly Pattern

"When they appear on the sun at the beginning of a cycle they are found to be from 30 to 40 degrees above and below the sun's equator. Subsequent spots break out a little nearer to the equator both north and south until at the end of the cycle they have reached very close to the equator. If all the spots remained and did not fade out they would form a pattern on the sun in the form of a vast butterfly. Few spots are large enough to continue around the sun for a second appearance," Mr. Colgrove continued.

"The sun is made of the same material as the earth. It is our nearest star and none knows the

Observed by the author at McGill U.

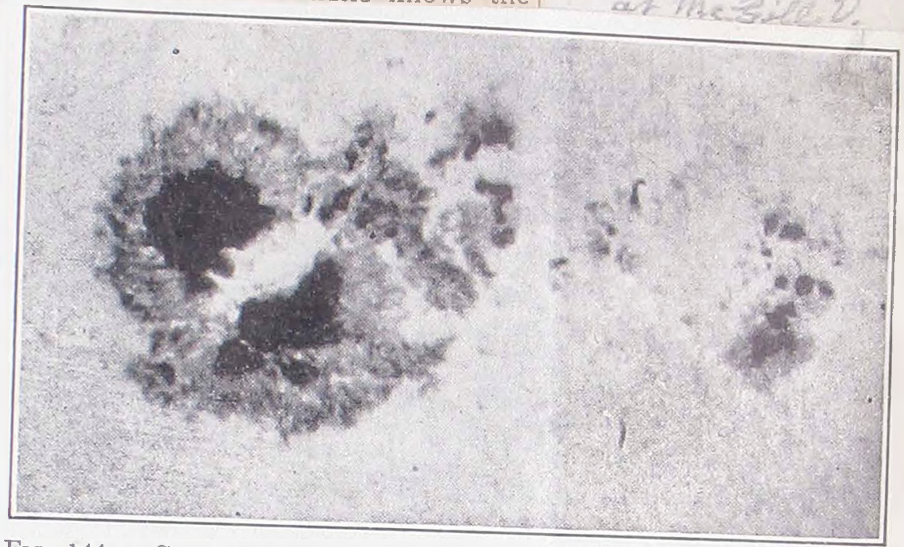
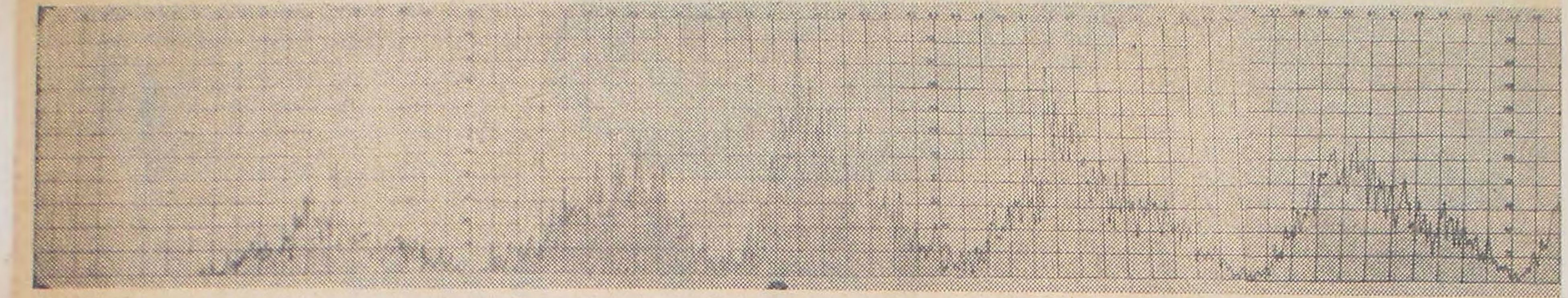


FIG. 144. — Great sun spot of July 17, 1905. *Photographed by Fox with the 40-inch telescope of the Yerkes Observatory.*

ionized atoms in high vibrations which causes our northern lights.

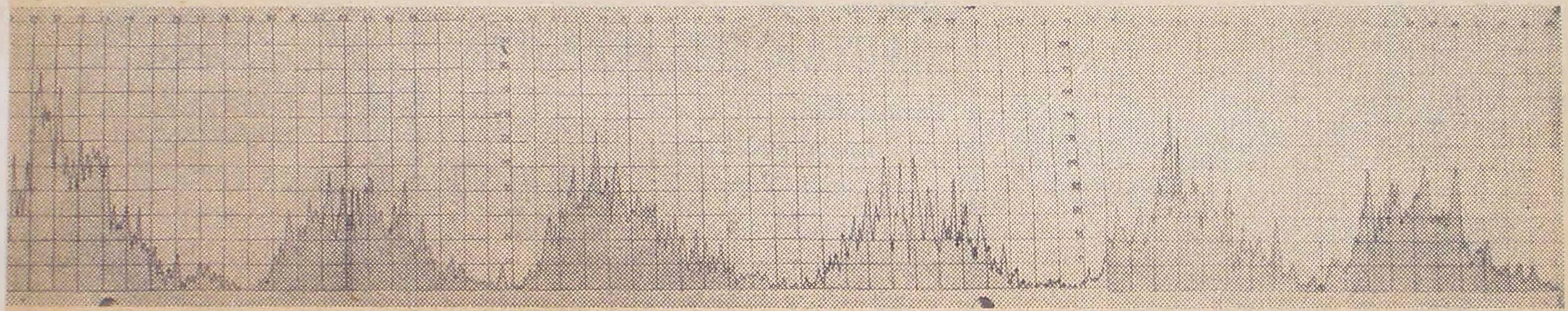
"At the same time some of this ultra violet light reaches the surface of our earth and disturbs the lower atmosphere, causing weather changes and disturbances of our magnetic instruments. A paradox of the sun is, that the more spots there are on the sun, the hotter the sun is. The sun therefore can evaporate more moisture from the water surfaces of the earth to form clouds which naturally bring more precipitation, either rain or snow. The clouds themselves protect us from the extra heat of the sun, thus making the earth cooler when the sun is hotter."

Sun Spot Cycle Chart Reveals Colder Seasons, On The Way Here, Will Be Evident For The Next Four Years



This chart, compiled at the Smithsonian Institution in Washington, and used by the University of Western Ontario, shows the number of sun spots for the last 130 years. Each peak represents the maximum number of sun spots for a cycle of 11 years.

The greater number of spots on the surface of the sun means a colder season, with more snow or rain. This condition of more cold is due here during the next four years. This is brought about by the fact that the sun is hotter when there are more sun spots on it. The hotter the sun is, the greater the evaporation is from the water surfaces of the world. This evaporation forms clouds which in turn protect the earth from the more intense heat of the sun. The lowest points on the chart indicate the minimum number of spots. From the lowest to the highest point on each line, approximately five years are indicated, while from the highest to the lowest point, six years are represented. The highest point on the chart, which shows the greatest number of sun spots, was established in 1837, the year Queen Victoria took the throne. The Smithsonian Institute is the greatest solar investigation establishment in the world, and is reported by Dr. W. G. Colgrove, instrument builder at the Observatory of the University of Western Ontario, "to be very dependable". This institution, along with the Mount Wilson Observatory, in California, does a great deal of the world's solar research. These two great institutions take pictures of the sun and other astronomical bodies approximately every hour. he reason for linking these two institutions is that they are situated on the opposite sides of the United States, thereby enabling themselves to observe two parts of the solar system.



W. G. Colgrove, M.A., B.D., Chant Medalist of the Royal Astronomical Society of Canada, and instrument builder at the Hume Cronyn Memorial Observatory of the University of Western Ontario, is a retired minister of the United Church. He lectures on the solar system and has written two books, "Some Solar System Data" and "Tom, Dick and Harry".

May 1947

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THE SUN AND THE FLOODS

Editor, Free Press: Some months ago I wrote an article regarding the connection between the sun spots and the weather in which I pointed out that according to the records of the Smithsonian Institution at Washington, there would be about four more years of heavier precipitation in the form of rain and snow. The first year has passed and the second has begun and I feel quite sure that most people who read the press are satisfied that that connection and the prediction or suggested inference, was sufficiently correct to merit further study. Since many readers have asked me questions about it, I have prepared this brief explanation regarding the action of the sun as a possible cause of the recent floods.

In the first place let us all remember that the sun is a vast globe of various gasses with an enormous central core where, in all probability, the atoms have been stripped of their electrons and condensed to a condition in which the mass is tremendously increased so that the sun's weight amounts to two octillion tons, written thus—2,000,000,000,000,000,000,000,000,000.

Its surface temperature is about 10,000 degrees F. and its central heat is said to be in the order of 18,000,000 to 40,000,000 degrees F. Its light as measured in various ways, reaches the inconceivable amount of three octillion candle power, while its energy is calculated to be some five hundred sextrillion horse power or 500,000,000,000,000,000,000,000.

Is it any wonder that such an enormous, chemically turbulent, hot body with a diameter of 864,000 miles and only 93,000,000 miles away, should sensibly affect our little earth? I do not need to remind the reader that our world does not receive all of the light, heat and power, but only approximately one-two billionth of it, which, nevertheless, is great enough to cause far more damage if there were no atmosphere.

You see it is one of the pretty ways of providence to make our planet habitable for folks like us. If our atmosphere, with its clouds, were removed, our race would immediately perish from the effects of extreme heat and ultra-violet light. It is in this atmosphere which is about six hundred miles high and of varying density, and weighing about six quadrillion tons, that the weather occurs.

In the second place we must remember that the spots come and go in a period of about eleven years, that is, they increase from minimum to maximum in about five years and then decrease to minimum again in about six years. At present we are within one year of maximum which has been tentatively set for January 1, 1948. Then the decline will begin, but the first two years of the decrease will be much like the two years preceding the maximum.

The past year has been one of unusual intensity with respect to spots, at times more than a hundred have been seen at the observatory and almost twice as many at the great institutions. In November of last year the average reached 125 and just now there is a large group which we measured at 165,000 miles long by 30,000 miles broad.

This powerful concentrated outburst has reappeared twice already and seems strong enough to make a third appearance in about three weeks since it is carried round by the sun's rotation.

We have all noticed that the effect of the present maximum is spread over almost the whole of the Northern Hemisphere but these influences may be felt at any place on the earth, more especially on the land areas where rivers are not walled by nature or by man. The spots are more effective with respect to the earth at or near maximum because there are so many more to cross the centre of the sun's apparent disk, and that, for us, occurs mostly in the summer or the winter time.

The place of contact is, of course, determined by the rotation of the earth. Now it seems quite clear the the present maximum, with nearly 200 spots at one time on the sun some of which are exceptionally large, is probably the prime cause of the recent floods, because as stated in the former article, the sun's heat increases with the increase of spots and therefore causes more evaporation from the water bodies of the earth.

Happily this means more clouds to protect us and vegetation from the extra heat, but it also means more precipitation and possible flood conditions.

It is therefore reasonable to conclude that 1948 and 1949, will be much like the past year and the one preceding it. So now you can see why we had the flood ten years ago which was also at a maximum of spots and you may be quite sure that those in charge of conservation might do well to get ready for the next deluge about another decade hence, although it may not come our way nor be so widespread and severe.

W. G. COLGROVE,

London, May, 1947.

P.S.: After this was prepared, I read an interesting article in the Saturday evening Free Press by Mr. Ruben Hornstein, M.A. M.B.E., one of Western's gold medalists, regarding the effect of Polar high pressure areas on our middle latitude weather.

According to Smithsonian records there are sixteen different causes for our weather, most of them quite insignificant yet necessarily included in any thorough scientific study and determination of the weather.

The sun, of course, is the cause of the rise and consequent fall of vast bodies of air which often take the form of wind whose speed may be that of a gentle zephyr or a destructive hurricane. t would seem therefore, that the sun is father of our weather, or at least, the most important agency in weather making. W. G. C.

The Fifty-fourth Meeting of the American Astronomical Society,
Toronto, September 10-12, 1935

Summer School
Students
viewing Venus
at noon in Aug.

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Aug. 8

Star Gazers In Victoria Park At Noon

1940

Today at noon astronomers went star-gazing in ictoria Park. The above photograph shows Rev. . G. Colgrove, president of the London centre of e Royal Astronomical Society, focusing a tele- ope on a sun spot. The telescopes were set up to ew an unusual set of heavenly phenomena, including the planet Venus, just past the peak of its greatest brightness but visible at midday. A great crowd of spectators collected about the instruments and there were many oh's and ah's as sky secrets were disclosed. Astronomy has attracted a large number of Londoners in recent years.

CROWD VIEWS VENUS BY D

Two Telescopes Set Up Victoria Park

CLOSEST POINT TO EA

Brilliant Planet Is Distinctly

A good-sized crowd of inter Londoners turned up in Vi Park today to take part in first daytime observations sponsored by the London C of the Royal Astronomical Soc

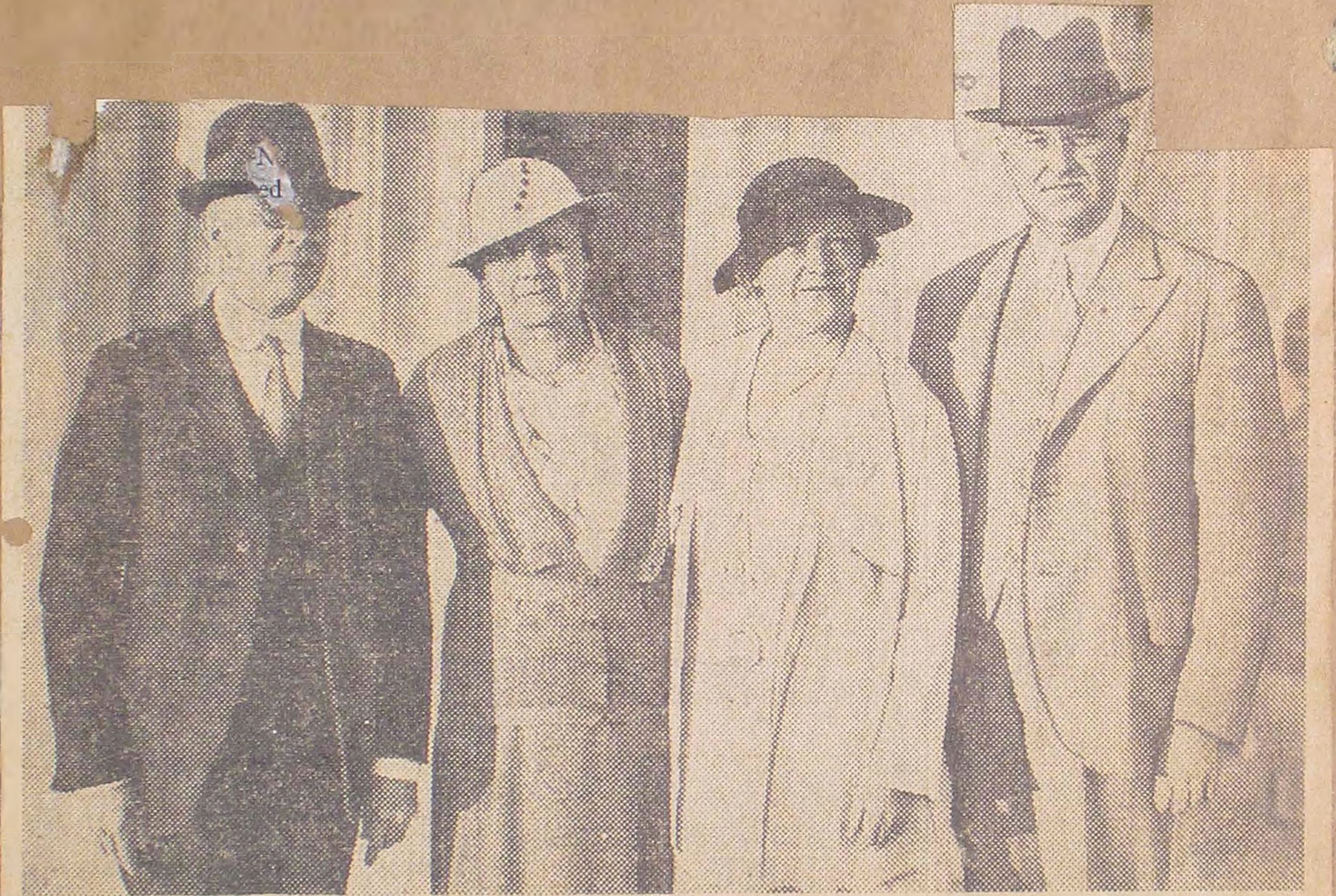
President Rev. W. G. Colg set up two telescopes at the side of the park to enable ob ers to see the unusual spect of the planet Venus shining bri ly in broad daylight.

Now at its closest to the e a mere 45,000,000 miles away, brilliant planet could be seen distinctly in the unbroken blu the western sky. Through telescope it showed as a tiny w crescent resembling the moon except that the cresc points were turned the other

Also on display were five l groups of sunspots, ranging 25,000 to 50,000 miles in width. an eight-inch image of the projected on a sheet of w paper, the spots looked not m larger than fly-specks.

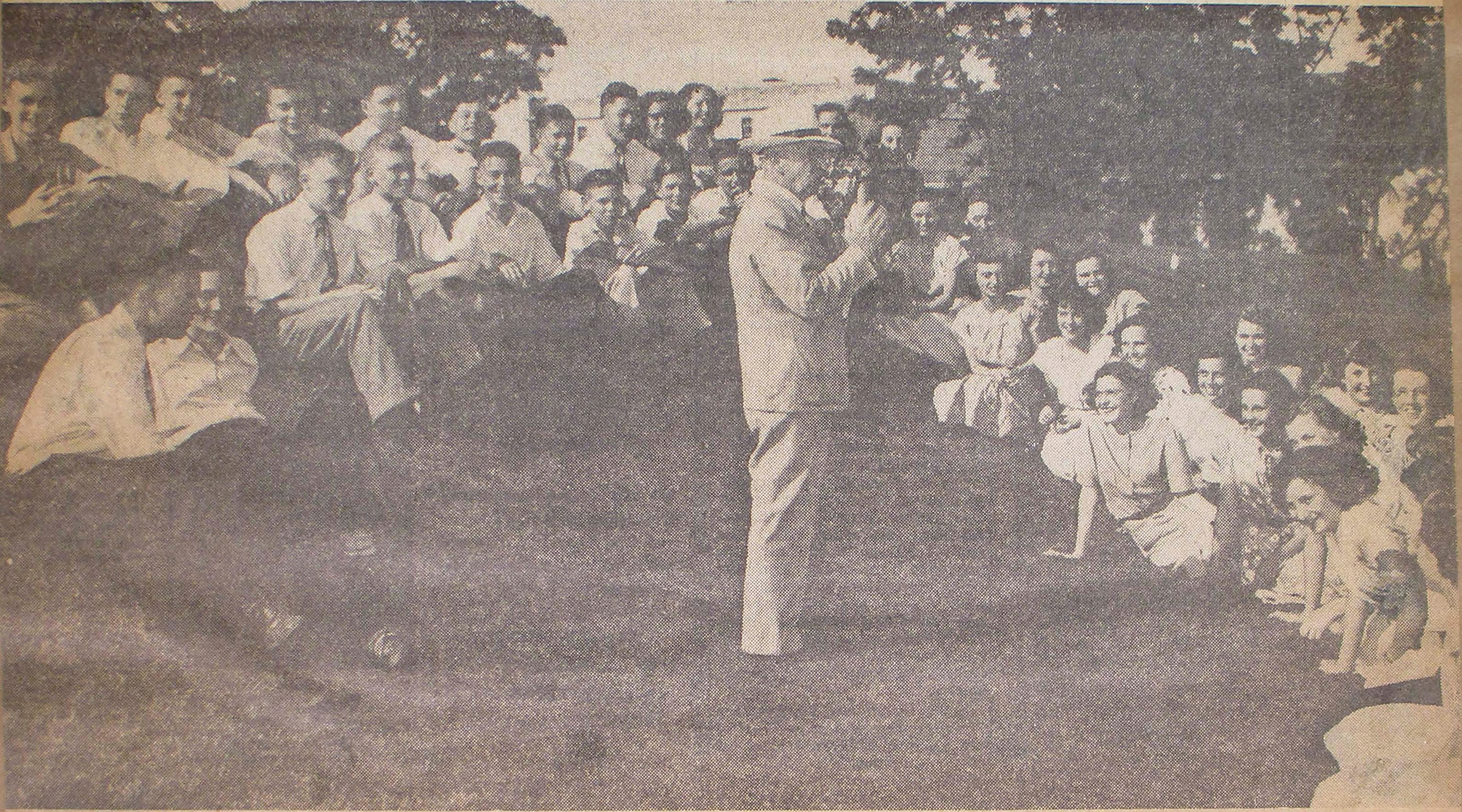
To complete the heavenly play, August's new moon faintly visible in the eastern

The author, rt.; his two sisters, and his brother-in-law, Mr. C. E. Symmons.



Dr. and Mrs. H. R. Kingston, the former, director of the departments of mathematics and astronomy and head of the Summer school of the University of Western Ontario, and Rev. and Mrs. W. G. Colgrove, also of London, at the gathering of astronomers meeting at David Dunlap Observatory. Mr. Colgrove's collection of instruments, entirely created during his spare time as an amateur, created much comment among the members of the society.

Tour of UWO Highlights Trip of Lucknow High School Students



Perhaps it was a joke.

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Six-Inch Telescope For Western University

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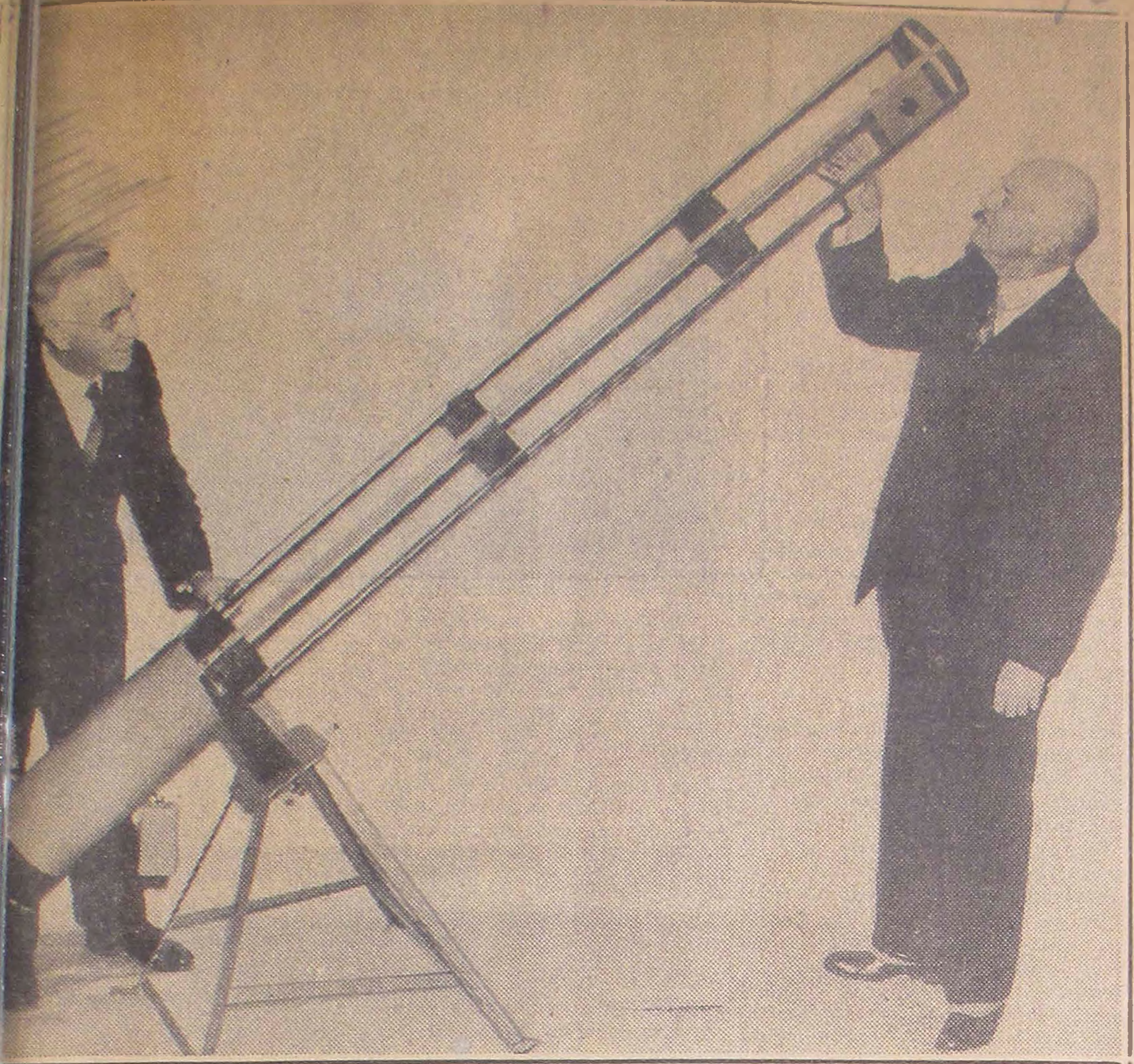

isit to the University of Western Ontario
at the Western Fair by Mrs. Thomas Sparks,
larys, resulted in her giving to the university
ient of astronomy parts for a six-inch re-
telescope which had been made by her husband, the late Thomas Sparks, years ago. The parts have been assembled by Rev. W. G. Colgrove, who is shown at the left with the telescope which was being examined by Dr. H. R. Kingston, head of the department of mathematics.

UNIVERSITY HAS NEW TELESCOPE

Mrs. Thomas Sparks, of St. Marys, Donates Equipment

STUDIED EXHIBIT AT FAIR

Parts Assembled for Use by Rev. W. G. Colgrove

The mathematics and astronomy department of the University of Western Ontario is today the happy possessor of a new, six-inch reflecting telescope because an interested visitor at the university's Western Fair exhibit this fall stopped and chatted with Rev. W. G. Colgrove.

The donor, Mrs. Thomas Sparks, of St. Marys, was interested in the display of astronomical apparatus in the mathematic department's exhibit, where Mr. Colgrove lectured daily on celestial phenomena. In a conversation with the lecturer, Mrs. Sparks recalled that her late husband had also been an ardent amateur astronomer and in her home, now discarded, were the requisite parts of a reflecting telescope. On learning that the university had but meagre astronomical equipment, and could well use more, Mrs. Sparks generously offered to donate the telescope to Western.

Mr. Colgrove drove to St. Marys at the first opportunity and picked up the old telescope. The lenses and mirrors were covered with the accumulated dust of nearly 20 years, but still fundamentally good. Several weeks work of polishing, cleaning and realigning were required to make the telescope usable again. Mr. Colgrove assembled the parts, remounted them in a barrel-like iron framework set on sturdy iron base and this week formally turned the telescope over to the university.

Dr. H. R. Kingston, professor of mathematics and astronomy at Western, was highly pleased with Mrs. Sparks' gift and Mr. Colgrove's painstaking workmanship. He told The Free Press the telescope would be a very welcome addition to his department's equipment, invaluable for demonstration purposes. Good instruments, he added, are extremely high-priced and usually beyond his department's budget, and such gifts as these are, for that reason, all the more appreciated.

—*Courtesy London Free Press.*

A SECTION OF THE ASTRONOMY CLASS GETTING ACQUAINTED WITH THE STARS

Tue. May 14, 1946

THE FREE PRESS, LONDON,

Huge 1,500-Foot Tube Seen As Lunar Rocket

Before radar reached out and probed the moon, the following article by Rev. W. G. Colgrove, Christie street, might have been adjudged too fanciful to warrant publication. Now, however, it at least provides material for interesting conjecture, visualizing as it does the day when man may reach the moon by jet or rocket-propelled space ship. This article is the second in a series, the first of which, appearing in The Free Press yesterday, quoted Col. H. N. oltoy, U.S. Army scientist, as authority for the contention that unar travel is feasible.

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Army Signal Corps, Jan 10, 1946 at Belmar, N.J.

BY REV. W. G. COLGROVE

THE recent radar experiment with the moon as target about 240,000 miles away has revived in the minds of some people the problem of space-ship travel and has brought to our attention the fact that it is a popular subject among the boys and girls of the rising generation. Since that experiment, almost every group of visitors to the observatory has asked about the possibility of such an undertaking, and we have made a variety of suggestions as to how it might be attempted, but have always stressed the improbability of surmounting the many difficulties and risks involved in such a hazardous and costly flight.

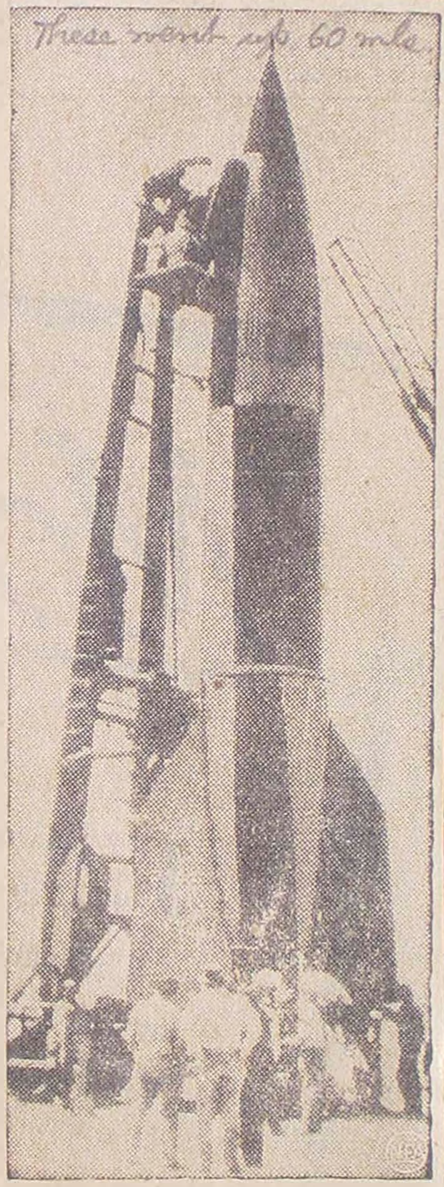
In the first place, it should be remembered that the accurate planning of such a trip would require months, even years, of the most careful scientific discussion and investigation before even beginning the task of drafting the plans. It would be necessary to employ a half dozen space ship designers and engineers together with an equal number of aeronautical experts with much mechanical, mathematical and scientific knowledge. For their convenience it would be necessary to build and equip a modern mechanized laboratory in which all parts could be designed and tested. Beside this, there would have to be a giant hangar capable of housing the completed ship and its cargo for the voyage, including great tanks of ozygen, oil, fuel, water, food, etc.

* * *

In the second place, it would be necessary to organize a strong group of financiers and scientists to sponsor the effort, to formulate the program and to solve the problems of preparation. This group would decide the size of the craft, including all necessary space for equipment and personnel. We suggest the ship take the form of a reinforced doubly-braced tube about 1,500 feet long and 30 feet in cross section with a large double-cased transparent nose and a slowly tapered body with a pair of fixed wings on top every 200 feet and in between each pair an extra pair of emergency wings folded back during flight.

It would be wise to build two smaller ships, one to investigate meteorological conditions out to the limits of earth's atmosphere, and the other to venture 1,000 miles into actual space to learn the value of wings, jets, rockets and space currents, if any. A trial trip of 10,000 miles should be made with the large ship, only half loaded, to prove its space-worthiness and the feasibility of further exploration. If these three "feeler flights" were successful, we would be encouraged to attempt the vaster plunge to the moon itself.

* * *



These went up 60 mls.

Will a space craft similar in design to this V-2, the Nazis' death-dealing weapon of World War 2, succeed in reaching the moon? Scientists no longer scoff at the idea.

In the third place, the committee in charge would have to call for at least 100 volunteers from whom they would choose the 25 or 30 best qualified men and their assistants and supply each with two masks and two individual supplies of oxygen to be worn every minute of the 50-day trip. The personnel would include a chief engineer, four pilots, an engineer, a navigator, two mechanics, a chemist, a physician-surgeom an orderly, an astronomer, a meteorologist, a geologist, a photographer, a radar operator, a reporter ,a carpenter, a plumber and chef.

Of course, the Insurance companies would immediately cancel all present protection and the finance committee would have to arrange some form of security for whatever dependents were left behind. It would be the task of the committee to assemble all the personnel and material equipment for the complete outfitting of the ship which we suggest should have both rocket and jet propulsion.

* * *

In the fourth place, the scientific groups would be engaged in plotting the direction of our course so as to reach the moon at a specified point in its orbit, say at or near apogee where its speed, whose average is 2,288 miles per hour, is only about 1500 miles per hour. This indicates that the ship must be capable of that velocity to insure a safe landing.

Such high speed, however, would not be necessary during the trip except to escape the possible impact of an occasional meteor that might cross our path. A speed of 500 miles per hour would be sufficient and would take us to the moon in 20 days. We would stay 10 days and would arrive at home again after 50 days. It is interesting to note that we would always be in sunlight if we kept away from the earth's shadow.

* * *

In the fifth place the committee would have to see that the designers arranged for comfortable bunks, lounges, books, magazines and games as well as a well-stocked kitchen full of fresh and prepared foods so that the chef could make about 5,000 meals.

Then the supply of clothing would have to suit the extremes of temperature during the trip and on the moon. Of course the ship itself would possess a modern system of temperature control but when men leave it to work on the moon's surface they will need electric hoods and overcoats for areas beyond the terminator, and palm-beach shorts and umbrellas to prevent sunstroke in areas under the sun.

Heavy iron-clad boots will be necessary on the moon's rough surface. Large bins, erected for various stores on the outward journey, will be gradually emptied but will not remain so very long, for the geologists, on arrival, will fill them with 100 tons of lunalogical specimens and meteorites.

* * *

To see what there is on the other side of a mountain range or hundreds of feet below in the yawning saucer of a crater it will be necessary to have on board a jet-propelled helicopter, and for tearing off large sections of the moon they'd need a jet-propelled jeep. It would not be very difficult because the density of the moon is only 3-5
of the earth's and th
gravity only 1-6 of our

Astronomical instrun
have a prominent plac
excursion for the de
sky will make the st
brilliant points while
will gleam with the cr
A powerful radar set
instaled to warn our
of approaching meteor
contact the earth by
ranged system of si
which to announce our
and our lunar activitie
searchlights would be
beyond the terminator
teries of mirrors for
shadows on the sunny

* * *

In the sixth place,
for landing our tubula
port with its precio
would be made en route
of the peculiar nature
and the fact that the m
no atmosphere and a wea
tational attraction as w
high speed of revolutio
load will be lighter th
we started so the engine
pilots will have to ma
the controls more carefu

To insure safe landin
will have to increase th
to 1,500 miles per hou
they keep close to the mo
watch for a spot in dayli
tween the equator and t
at about 800 miles from
minator where the temp
would be about 70
fahrenheit. This precautio
be necessary because th
perature on the sunward
the moon during its two
daytimes varies from
grees fahrenheit at the
to about 60 degrees fa
below zero at the termina
during its black tw
night the cold increases
degrees fahrenheit below

* * *

It would be interesting
cuss our activities at
length but I think your
ation may be as good a
so I will close this curiou
by reminding you that
tons of moon material
crease to 600 tons as we
again on earth. But how
land on a world that is s
around the sun at 66,60
per hour? We can't meet i
on without a death-dealin
and we can't catch up
because our utmost spee
times too slow and we
come alongside of it as we
the moon for it would pas
like a shot from a super

Well, then, what shall w
Why didn't we think of th
fore we started? What f
make the crazy venture!
vacuuity of wishful think

* * *

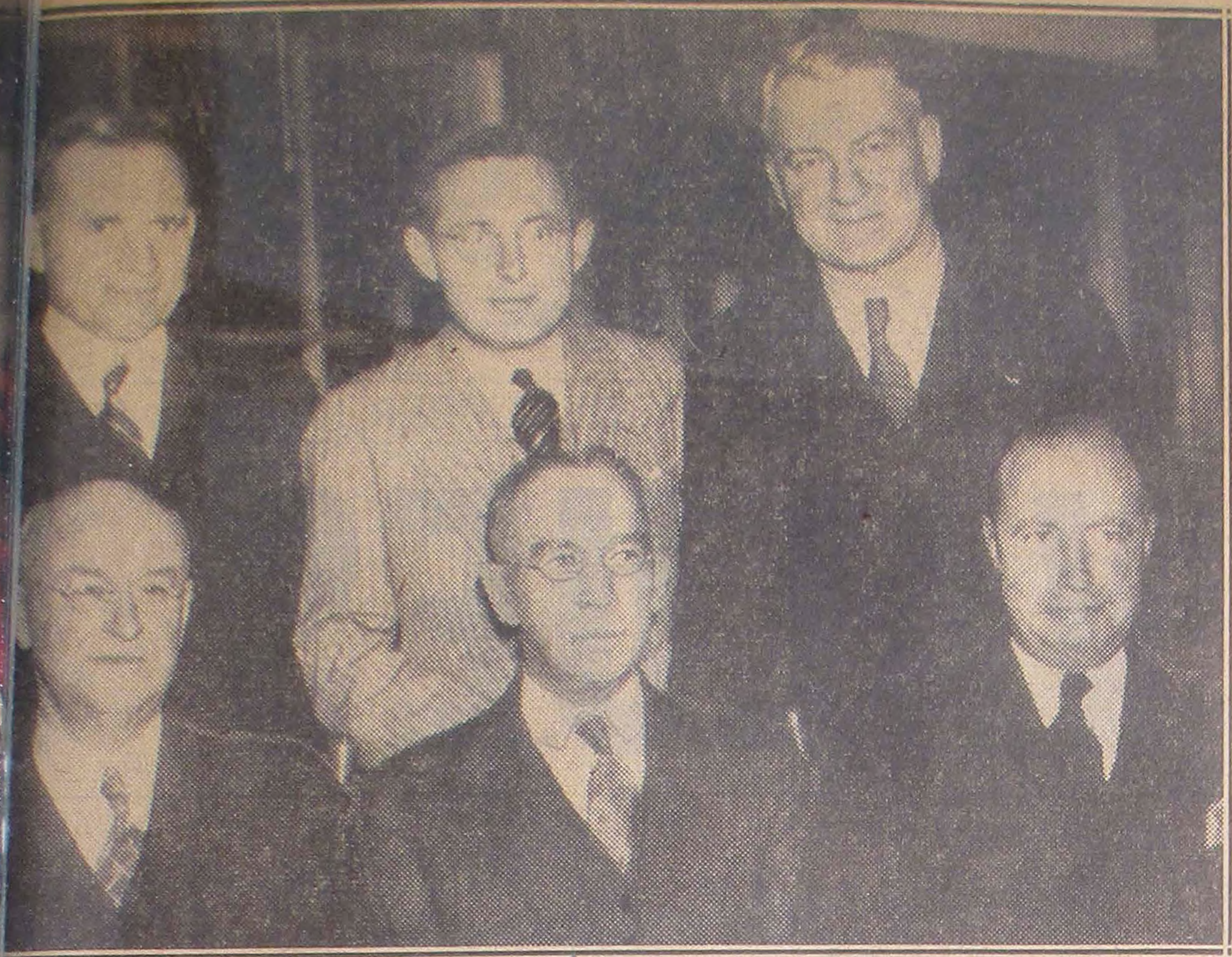
Our fuel is getting low
have to land somehow, so
goes for a head-on attemp
the ship turned backward
all jets blazing and all win
to release the awful sho
total destruction.

Good-bye folks! We've
our best and we die in the
for truth. Let your imagi
paint the tragic scene—a
tered space-ship sprinkled
a mountain-side or sunk
scattered wide upon the de
ocean floor. Please bury
you can find of us and
piece of the moon at ea
our heads.

We little thought that we
bringing home our lunar
ment!

Officers-Elect of Astronomical Society

Dec. 10, '38.



London centre of the Royal Astronomical of Canada held their annual meeting at mal School last night when Rev. W. G. was elected president of the society. The hoto shows a group of officers and Major Anundson, who will be the London centre's delegate to the general council meeting at Toronto. Front row, left to right: Dr. H. R. Kingston, honorary president; Mr. Colgrove, and Major Anundson. Back row, left to right: J. C. Higgins, past president; Dr. J. R. Magee, secretary-treasurer, and T. C. Benson, vice-president.

MR. COLGROVE NEW PRESIDENT

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Elected Head of Local Astronomical Society

AT THE ANNUAL MEETING

Reports of Successful Year Presented to Members

Unselfishness is a traditional virtue of your true student of astronomy, it was stressed last night by Rev. W. G. Colgrove, of the botanical department of the University of Western Ontario.

Mr. Colgrove spoke briefly after his elevation to the presidency of the London Centre of the Royal Astronomical Society of Canada. The men and women of the district who devote much time throughout the year to a study of the great cosmic mysteries of the universe, met in the Normal School for their annual business session.

President-elect Colgrove added: "This band of men and women is rather unusual in that it follows the path of the true astronomer, attaining the high mark of unselfishness; a total unselfishness in regard to his knowledge, his helpfulness and his fellowship."

OTHER OFFICERS

Other officers chosen last night for 1939 were; T. C. Benson, vice-president; Dr. G. R. Magee, secretary-treasurer, and the following councilors, Omar Kilburn, St. Thomas; Miss S. Livingstone, Westminster Hospital and W. L. Scandrett, John Middlebrook and Don M. Hennigar, of London. Professor H. R. Kingston is honorary president, John C. Higgins is retiring president and Major Harold Anundson was named as representative to the central provincial committee.

The annual report, which recorded a most successful year for the local branch, was read and adopted. Many edifying lectures were given during the twelve month and outside observations of stars, comets and other interesting phenomena were held.

It was reported the society may have to meet next year in either Normal School or Technical School as former quarters may not be available. There was a more or less humorous suggestion that space in the new library will be available in due course.

As last night was the windup session for the term, technical subjects were avoided and refreshments were served after the business sitting.

Let Us Have a Proper Symbol for Pluto

(Letter to the Editor)

Not long ago I received a letter from a prominent astron[illegible] United States in which he said he was the author of the present symbol o and that it was acceptable to the Lowell Observatory, he iron railing in the new building at Harvard Observatory, wa a former president of Harvard in his "Life of Percival Lowell", and is print in the *American Ephemeris,* an official publication of the United States gover ment. This weight of authority looks difficult to move in an effort to sec a truly appropriate and scientific symbol for this recent planetary discov But it is desirable to obtain a fitting symbol.

One may remark on some of the carelessly conceived symbols we already have, e.g., that for Leo, which is much like the one for the ascending node; those for Virgo and Scorpio, neither of which is truly symbolic; the curious combination of the symbols of the sun and Mars to take the place of Herschel's H for Uranus, and now the return to the "initial" method for Pluto. Percival Lowell called it X, let it be completed in a scientific way. Some persons thought the present symbol was a temporary suggestion awaiting a more carefully devised creation; and surely it should not remain if we can find something truly symbolic.

The change suggested is to keep the X and simply surround it with a circle. Letters are not scientific symbols except in algebra and chemistry and never find monograms so used. The X has always stood for the unknown ty and the circle may properly be added to indicate that astronomers now surrounded this planet and included it in the solar family as we thin the circle of their ever-expanding knowledge.

I submit the truly symbolic symbol of a multiplication sign w. for Pluto, and add that it can never be confused with ⊕ a plus s n a circle, for the earth?

W. G. Colgrove.

London, Ont.

Astronomers Confirm Biblical Tradition of 398 Star of Bethlehem

Modern Science Proves Signs Were in the Heavens at the Annunciation; Three Conjunctions of Jupiter and Saturn Year Prior to Birth of Christ

Dec. 23, '38.

Modern astronomical science has confined the Biblical story of the Star of Bethlehem which shone over Christ's birthplace 1,900 years ago and has even assigned a name to the celestial phenomenon which appeared on that first Christmas Day. Today Rev. W. G. Colgrove, M.A., D.D., retired London clergyman and amateur astronomer, told The Free Press of the sources, background and history of this confirmation.

In the early days, Mr. Colgrove said, the peoples of Eastern countries studied the stars, and the Jews had always expected their Messiah to be heralded by a star. The Magi, or Wise Men, started their journey under the guidance of a brilliant star which seemed to go before them. Some have asserted that this strange phenomenon was a newly-created star, others have thought it was a temporary comet or a flaming meteor. Today it would be called a Nova, or a long-period, variable star which seems to have increased in brightness at the same time, and in the same constellation as a triple conjunction of planets.

IN GENESIS

The easrliest known astronomy, then called astrology, had its beginnings in the formation of the constellations, together with their meanings. Genesis 1:14 reads, "Let the stars be for signs and for seasons, and for days, and years." Signs, Mr. Colgrove believes, not of mere human or natural phenomena, but probably of unusual divine events. This was not astrology as we know it today, but rather simple Oriental astronomical symbolism. "Modern astrology," Mr. Colgrave says, "is an intellectual abortion, an astronomical ape so ridiculous and so utterly pedantic as to merit only the anathema of thinking people."

In the very earliest times the order of the 12 Zodiacal signs began with Virgo and concluded with Leo, just as the Gospel begins with the Virgin and her child and ends with the final triumph of the Lion of the Tribe of Judah. The constellation of Virgo, with its related groups of Coma, Centaurus and Bootes, is accepted as that which symbolizes motherhood and birth of Christ.

Turning to modern astronomy, Mr. Colgrove pointed out that present-day findings concur with this belief. At midnight at the Vernol equinox in March, nine months before Jesus was born, the sign of Virgo was on the meridian of Bethlehem, indicating the announcement to Mary. At midnight at the winter solstice in the following December, this same sign was rising, and precisely at the same time a new star appeared in Coma and stood apparently over Bethlehem at that time. It was not specially created, but it did herald the first Christmas and its Christ-child.

LARGEST PLANETS

Besides these unusual events, the annals of astronomy show that during the year prior to the birth of Jesus there were three conjunctions of the two largest planets, Jupiter and Saturn, which occur in the same constellation only once in 800 years. While this was being watched, a third planet, Mars, arrived to add its glory to the scene and thus provide a rare, triple conjuction. Still more remarkable, these conjunctions occurred in Pisces, the zodiacal sign of the fishes, which in all ancient astronomy was assigned to the Hebrew nation.

"This we see," Mr. Cosgrave concluded, "the convergence of the dim light of tradition and mythology, the clear bright, bright beams of sacred and profane history, and the precise and penetrating rays of ancient and modern astronomy all focused on this most marvelous and romantic revelation of God—a Nova and a triple conjunction of the most important planets as heralds of the birth of Christ."

Mar 1, 47

Naturalist Acts As UWO 'Guide'

Visitors at yesterday's University of Western Ontario convocation were "shown around" the University by a cheery, 75-year-old retired minister, Rev. W. G. Colgrove. Maybe when they have forgotten the words of the convocation ceremony, and the contents of huge exhibit cases seen on their U tour, they will remember their guide.

Eager, questioning Rev. Colgrove, bright eyes encouraging the newcomer to look, quick tongue interpreting known scenes with telling quips and shrewd judgments, celebrated his 75th birthday the day before the special convocation.

He is the university's ex officio astronomer, has charge of a 14,000 specimen botany collection, and likes "helping out" in the geology department.

Visitors found there isn't a turn or cranny of the "U" unknown to Rev. Colgrove. From the science building, where he explained chemistry, physics, geology and botany, he led the way to the Music and Arts building, thence to the observatory and library.

There is one generality to sum up Rev. Colgrove's diversified interests — they all have to do with nature.

"I wanted to learn all about nature, I love it so," said Rev. Colgrove. The stars, which he watches through the observatory telescope, rocks which he cuts, polishes and trims for the geology department, flowers which he mounts and files in the botany collection — all are part of nature.

Among the few dislikes of Rev. Colgrove are tobacco and liquor.

He is an amateur gardener of some note, and likes woodworking. He has evolved and constructed numbers of astronomical teaching instruments, and has also made many wood gadgets for veterans recovering mental health by means of occupational therapy.

With an eye to the future, Rev. Colgrove has written poetry on the rocket ship, as well as a mass of other poetry of all types.

Of all the remarkable and inspirational sights for the visitor at the University of Western Ontario, perhaps their guide — they agree — is the most notable.

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"Sky-Gazers" Get Glimpse of Meteor and Comet

Local astronomers last night had a view of the Perseid meteor and the Finster comet from a vantage point in front of the Arts building of the University of Western Ontario. However, the view of the meteor and comet was not altogether satisfactory, as a haze obscured the view for the greater part of the evening. Both would be easily visible now if the sky was clear. The above photos were taken at the university by a Free Press cameraman. Top—A general view showing a group of spectators gathered around Rev. William G. Colgrove and his four-inch refracting telescope. John Middlebrook, a member of the London Astronomical Society, who was in charge of the arrangements for the observation of the meteor, is at the right, and Dr. H. R. Kingston, of the Western faculty, second from the right. Bottom left—Several members of the London Camera Club had their cameras trained on the skies with the hope of photographically recording the event. F. H. Coates, president of the club, is at the left, and A. E. Adams, club treasurer, at the right, in the photograph. Bottom right—Rev. W. G. Colgrove as he pointed in the general direction of the meteor to Roy C. Cassie and his daughter, Velma Cassie, of Fort Erie, as the skies cleared briefly revealing the meteor and comet. Mr. Cassie is principal of a Fort Erie public school and is attending summer school at the University of Western Ontario.

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His latest construction is the miniature sun-earth-moon system. This is one of the most timely. It came in handily for the eclipse of the moon. It shows the relation between these three large bodies, and the relation also between the ecliptic and celestial equator and the moon's orbit. The wood used in this was turned in Mr. Colgrove's own lathe. As for the metal gears, minutely filed, that was where the egg beater parts came in.

SHOWS STARS

The third and largest instrument to come in for observation was the planetarium. Persons who saw the huge planetarium at the Chicago Century of Progress would see something different again in looking at Mr. Colgrove's creation. The one at the World's Fair, however, might more accurately be classed as "star theatre," it is declared. The one designed by the Londoner is a simple planetarium illustrating motions, configurations, relations and positions of all the planets and the more important moons. It is in fact a miniature of the entire solar system. What Mr. Colgrove had to begin with on this was an electric lamp placed in the centre to represent the sun; a number of colored "planets" long strands of wire, graduated circles. The whole thing is mounted on a pedestal.

He also has a rather unique wire construction which demonstrates the hellical paths of the planets as they ride around and with the sun in its flight of something like 400,000,000 miles a year.

Over in one corner of the group stood a blue and white colored cardboard which, at first glance, looked like an example of modern art, ultra modernized many degrees. What it really turned out to be, however, was a model of our galaxy or universe, built to scale, and embracing every star we see. It has the form of a spiral nebula in which the position of the earth has been worked out by its designer to show exactly where we are situated among the stars. Persons anxious to find "their place in the sun" are recommended to see this.

He has made, too, a large star chart which shows all the constellations together with mythical figures and their relations to each other. A reflector telescope is equipped with a six-inch concave shading mirror, a right angle eyepiece and a slow motion adjustment. At a glance it looks like a length of stovepipe, and that is what it was in the beginning.

To top it all Mr. Colgrove has written a handbook for the amateur on astronomy, and well he might. The manuscript of this was read by Pro. Chant, of the University of Toronto, and by Prof. Kingston of "Western."

Aug. 1935

Models In Smallman And Ingram's Window Show Planet's Position

FROM UNIVERSITY

Practically all of the universe has appeared in miniature in Smallman and Ingram's store window, a display of the extension department of the University of Western Ontario hand-made by W. G. Colgrove, M.A., B.D., of London.

The most recently completed part of the display is a representation of the galaxy—which is revolving in about 210 millions of years in actual fact, so the miniature is content to stand still.

There are several planetariums showing the various planets as balls on the ends of arms. This allows students to form a clear conception of the relative position of any of the heavenly bodies. Little moons of planets and the rings of Saturn are shown. There is also a representation of the newly discovered planet, Pluto. The star chart back in a corner shows how the various mythological conceptions of star arrangements were developed. Here are the animals and figures which people through the years have believed the stars to represent.

Paths Are Shown

A pillar of wire twisted about in helical form shows the paths of the great masses of matter which travel on through space. The paths of Mercury, Venus, Mars and Jupiter are shown and also the comparatively miniature spiral of the moon twisting about the earth.

The star pointer is an earth with wires radiating out in all directions; the length and direction of the wires indicate the positions of the better known heavenly bodies. By taking the star pointer, setting it to correspond with two known stars others could be easily found.

The display also includes a spectroscope, the weapon whereby the astronomer investigates the composition of heavenly bodies by the light they give off.

A tellurion, made with the cogs of a household egg beater, shows the earth and sun maintaining their various relationships throughout the seasons.

Shows Relationships

The constellarium shows the relationships of the stars in groups. In the display are two telescopes. One is a four inch refractor, that is one which bends the rays of light by passing them through lenses. The other is a small reflector for demonstration purposes; its reflection is a cheap magnifying shaving mirror.

Mr. Colgrove built the instruments in his own small work shop. He has in addition written a number of astronomical works including "The Solar System," a compact hand book covering a wide field. Mr. Colgrove will present a number of astronomical lectures in connection with the University of Western Ontario extension work.

June 1935

BUY AMATEUR'S STAR MACHINES

Prof. Kingston of 'U' Likes Astronomical Set

Prof. H. R. Kingston, astronomer of the University of Western Ontario, said to-day he thought so much of the series of astronomical instruments made by Rev. W. G. Colgrove as an "amateur" that he had decided to buy several of them for the university.

"They are better than I can get any place else," said Prof. Kingston. "I don't know where I could get a planetarium as good as this."

Mr. Colgrove made a series of about 18 instruments, using pieces of stovepipe, parts of egg beaters, sheet iron and a good deal of wood and wire.

June 1947

Aids to Teaching Astronomy Invented

The facile fingers of Rev. W. G. Colgrove, lecturer in astronomy at the University of Western Ontario, are more in demand than ever.

He has invented about 20 astronomical aids to teaching.

Most of the equipment including planetariums at University of Western Ontario, has been designed and built by Rev. Mr. Colgrove.

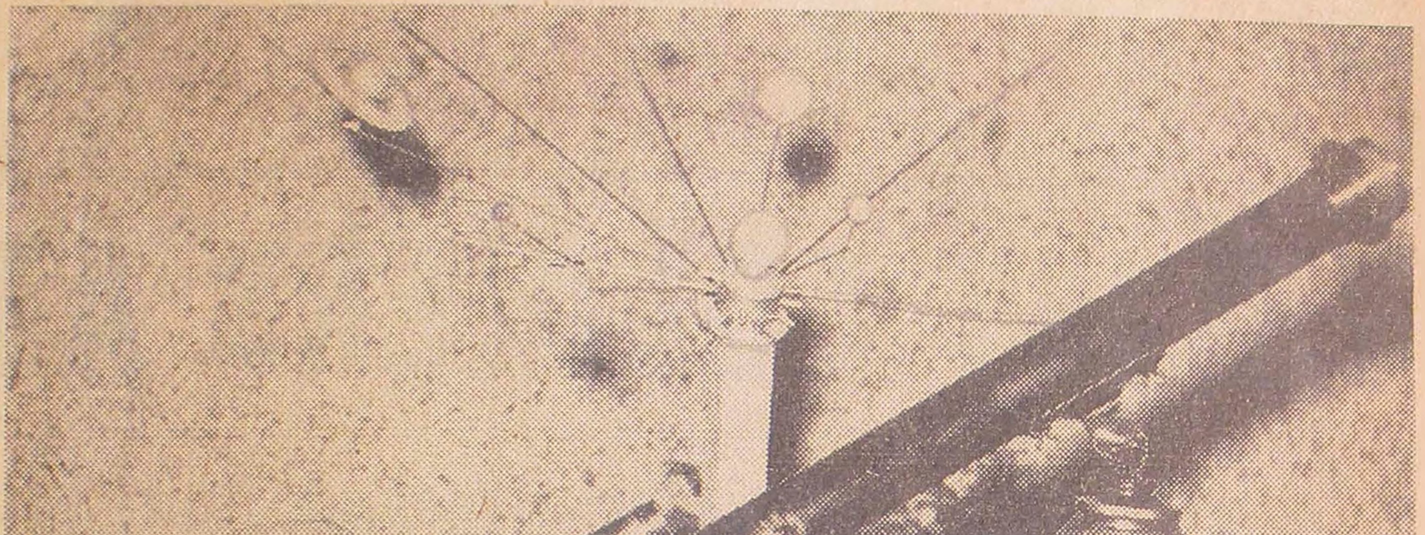
He has also supplied equipment for the University of Saskatchewan.

Now orders have been received for additional equipment to Toronto University and Wayne University in the U.S.A.

'U'

o a B

London Preacher Views Peltier's Comet



REV. W. G. COLGROVE, M. A., of 2 Christie street, London, has thrown open an invitation to anyone interested, to come to his home to view Peltier's comet. While the comet is now leaving the sun it will be visible for about a week. When the comet will return is not known, or it may never return. Jupiter has attracted and held 30 comets which revolve about it at regular intervals and Peltier's comet may likewise be attracted. Mr. Colgrove is shown with his telescope at the rear of his home. Mr. Colgrove is a member of the Royal Astronomical Society and author of the book, "The Solar System." *(Staff Photograph.)*

July 1938

EXPLAINS WORKS OF SOTELLUNIUM

Most Recent Invention of Rev. W. G. Colgrove

WILL IMPROVE CHARTS

Demonstrates Position of Sun, Moon, Earth Any Time

Rev. W. G. Colgrove, retired clergyman and noted amateur astronomer, gave The Free Press a preview today of his most recent invention, the Sotellunium.

Rev. Mr. Colgrove explained the name was derived from the three Latin words for sun, earth and moon. Like most inventions, this one was mothered by necessity.

"There has always been a need for some mechanical device which would show the position of these bodies in their true relation to each other at all times of the year," said Mr. Colgrove.

Until the London astronomer perfected this Sotellunium, astronomical demonstrations have been limited to one-dimensional charts. With. Rev. Mr. Colgrove's working model, the true position of the moon, sun and earth can be demonstrated for any time of year, it is claimed.

The Sotellunium performs four principal functions, according to the inventor. It shows the revolution of the earth around the sun, the rotation of the earth on its own axis, the revolution of the moon around the sun in its true elliptical orbit (the first time this has been shown mechanically), and gives, in one complete swing on the handle, a full yearly record of the relative position of the three bodies. The earth is offset so that, no matter what the position of the Sotellunium, the polar axis always points north.

POINTERS SHOW WAY

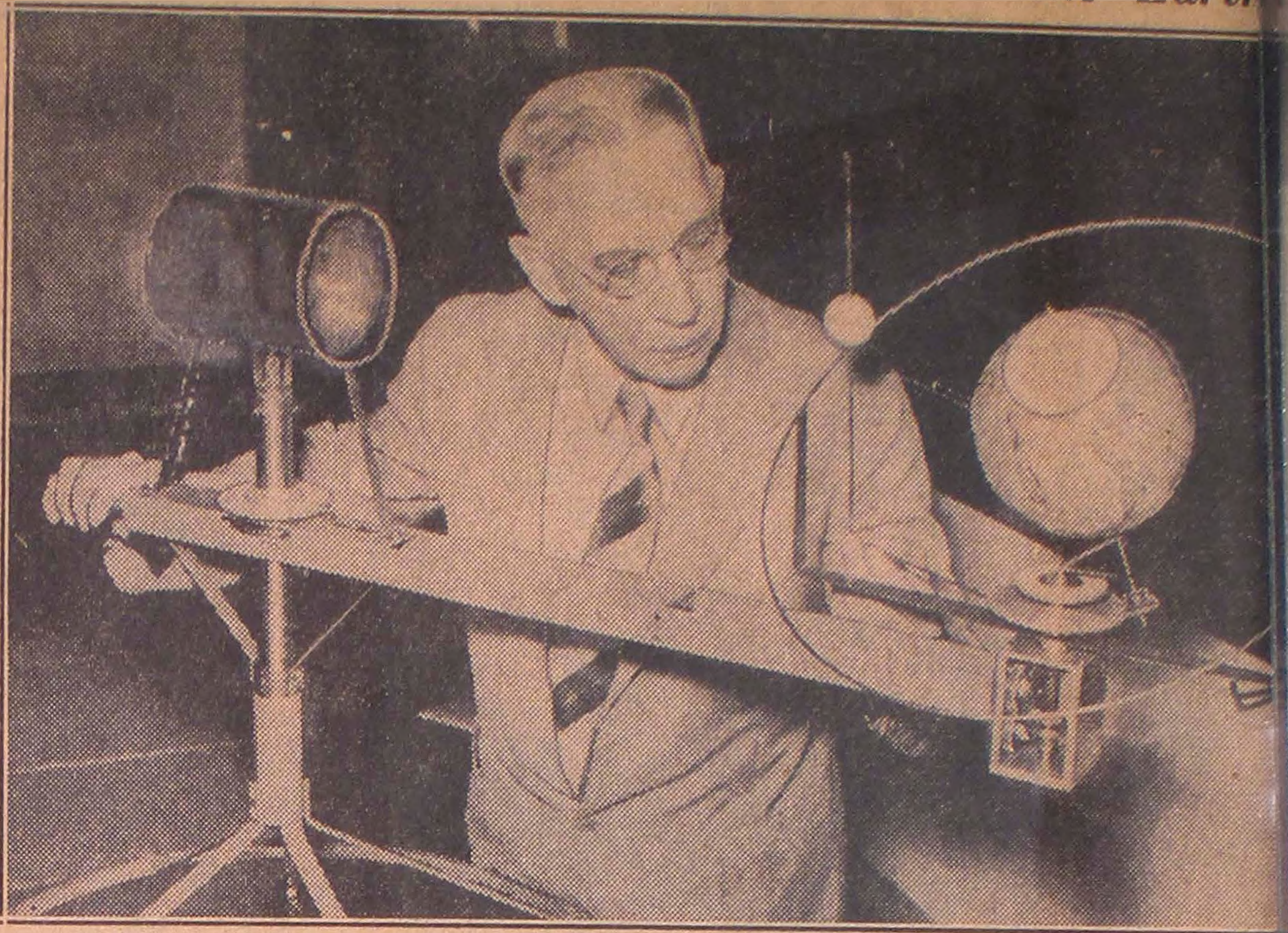
Under both the earth and the sun are two graduated circles, over which pointers travel when the device is set in motion. That under the sun shows the monthly position of the earth; the indicator under the earth shows the direction of other planets and the constellations in which they can be found.

The true orbit of the moon is shown, to demonstrate that many times in its orbit the moon cannot eclipse the sun or be eclipsed by the earth. Rev. Mr. Colgrove pointed out that his is the first model to show why this is so. In addition to the orbit of the moon, this satellite can be seen in all its monthly phases by means of the beam from the "sun" at the opposite end of the Sotellunium. This 100-watt sun is bound around with a wire equator to show why sunspots are more prevalent in summer and winter than in other seasons of the year.

The inventor said there were many more uses to which the Sotellunium can be put. He has presented it to the university's astronomical department and it will be shown at their display at the Western Fair. The Sotellunium is Rev. Mr. Colgrove's 12th invention along this line, and he spent about nine months on it with the aid of university technicians. He hopes it will be copied by other schools and universities, and while he could not estimate the cost, said it would be well within the reach of any institution.

Dr. H. R. Kingston, head of the university's astronomical department, said "it is the best instrumental aid I have ever seen for the demonstration of difficult stronomical problems."

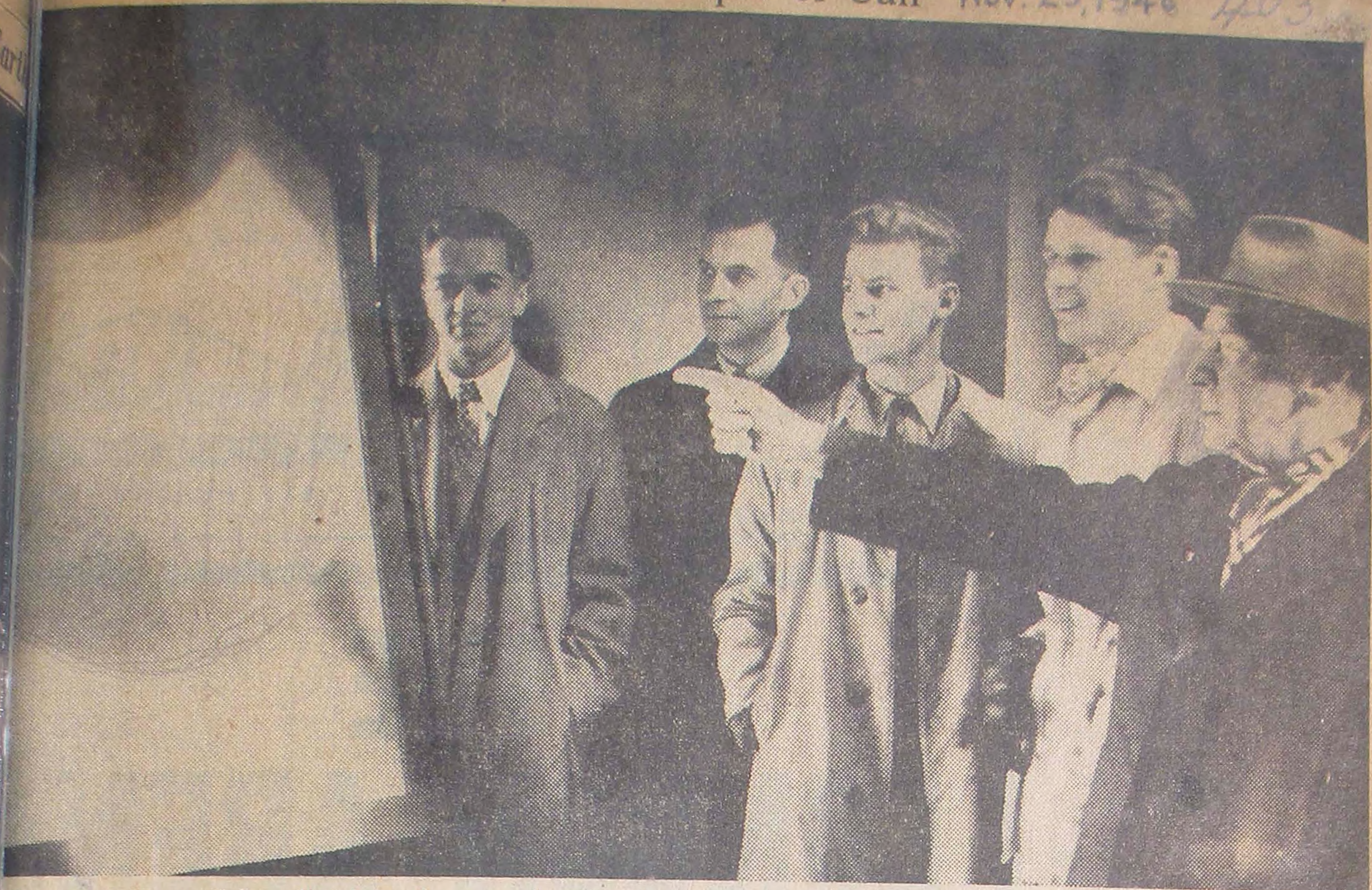
How the Moon Revolves Around the Eart



Probably the first educational instrument devised to aid in astronomical teaching of the correct relation of the moon as it revolves about the earth while both planets are circling the sun has been announced by Rev. W. G. Colgrove, lecturer in astronomy at the University of Western Ontario. The instrument is called a "Sotellunium," and Rev. Colg shown checking the instrument for the der tion of a lunar eclipse. The lamp at the lef sents the sun, while the moon revolves ab earth at the right on its elliptical orbit. Ma doners have become "star" conscious the pa

As City Saw Eclipse of Sun

Nov. 23, 1946 403



the sun being partially eclipsed by the moon is seen ated here by Rev. W. G. Colgrove, public lecturer of the nyn Memorial Observatory (pointing, at right). The large e is the sun's image thrown on the white screen by the lescope of the University of Western Ontario. At the top ck image of the moon photographed soon after it began to move across the sun's surface. Below the moon, and nearly in the centre of the sun, are a series of sun spots, estimated to extend over 100,000 miles of solar surface. The eclipse was seen over a wide area of the continent. Students, left to right, are: Jack Labatt, Stan Kostashuk, Bob Snyder and Bill Johnston. (Free Press Photo.)

London Gets Good View Of Noon-Day Eclipse; Seen Over Canada, U.S.

Londoners with smoked glasses were afforded a good view of the slightly more than 50 per cent eclipse of the sun which occurred between 10.40 a.m. and 1.42 p.m. today. Only slight haze drifted across the face of the sun during the celestial show.

The eclipse was visible in varying degrees in all parts of Canada and all but the southeastern corner of the United States. In Greenland it was expected to reach 78 per cent totality.

Though of slight scientific importance, and lacking the popular attributes of the total eclipse, such as the roosting of birds and cows coming home from pastures, the event was watched by scientists and astronomers with interest.

The weather was not promising during the early morning, as falling snow made it impossible to open the telescope at the University of Western Ontario observatory in time to catch the first rim of the moon sliding over the sun's sphere at 10.40.

As if in answer to the wishes of the astronomers, the snow stopped at 10.45, and five minutes later the observatory sun roof was swung open. The long tube of the 10-inch refractory telescope probed upward in search of the sun, throwing its image onto a large white screen in the observatory.

The moon's slightly jagged rim was seen to be already well over the round pale sphere of the sun which was magnified to 40-inch diameter on the screen. Also revealed were a series of large sun spots almost in the centre of the sun and of perhaps 100,000 miles extent—on the sun's surface—which will porbably adversely affect terrestrial radio communications.

University students watched the progress of the eclipse, following closely explanations given by public lecturer in charge of the observatory, Rev. W G. Colgrove.

The moon's black image covered the entire upper half of the sun, yet did not appear to make any appreciable difference to the light falling on the earth.

The eclipse followed its expected course very exactly, reaching its fullest extent at shortly after 12 and ending about 1.42.

Astronomy Puzzle

Pluto -- New Planet in the Sky

By W. G. Colgrove, M.A., B.D., U.W.O.

DISCOVERY—For many years astronomers were puzzled by the unusual way that Uranus, the seventh planet, was perturbed in its plotted path and in 1846 they discovered the cause in a new, more distant planet, now called Neptune, but later, when Uranus had passed from the range of Neptune's influence, it was found that Uranus continued to act in a similar fashion but with much less variation.

This caused astronomers to suggest that there might be another planet, more distant than Neptune, whose gravitational pull was sufficient to account for these lesser perturbations of Uranus. Among those who became most interested in the matter was Dr. Percival Lowell, a wealthy New England mathematical astronomer who, in 1894, founded the now famous Lowell Observatory at Flagstaff, Arizona, for the special study of the planets. After years of painstaking and lengthy calculations he felt that he had determined the spot in the sky where the suggested body might be found, but it was not immediately discovered so he directed some members of his staff to undertake an intensive photographic search along the ecliptic near the proposed location.

This was carried on for several years and finally resulted in tracking down the elusive planet near the star Delta (Wesat) of the constellation Gemini in January of 1930 but it was not announced until the following March. The astronomic world, of course, stood on tip-toe to welcome this new member of the Solar System and to suggest a name for what had been designated only as X.

* * *

NAME—After much discussion and correspondence with professional astronomers the name Pluto was suggested by a child in England and at once was adopted. This was very fitting because that was the name of the ancient mythical god of the under-world of darkness and must not be confused with Plutus the god of wealth, nor with Pluto, the dog. It is rather significant that its first two letters are the initials of Percival Lowell; and may I add another interesting feature: Pluto stands for—Percival Lowell Unusual Telescopic Observer.

The best known myth about Pluto is the one which tells of his coming to the earth's surface in search of a wife, and how he seized Proserpina, the beautiful daughter of Ceres and bore her away to Tartarus as his queen.

SYMBOL—The X it had before it was discovered was merely an algebraic letter and properly indicated it as an unknown quantity, yet it might have become a part of a real symbol if those in charge had simply put a circle around it to show that it was now within the family of the solar system. This, however, was not done and instead we had forced upon us a non-symbolic diagraph B, the initials of Percival Lowell, to which he would never have agreed if he had been alive. The precedent which was established in respect to Herschel and his planet Uranus was pushed rudely aside but we hope it will be restored as time passes and we shall have a proper symbol for this ninth planet.

DIMENSIONS — Without explaining the method of determining its diameter we shall just state the latest estimate is that it is about the same size as the plenet Venus, say 7,500 miles. Its density seems to be much the same but its temperature is said to be in the neighborhood of 400 degrees below zero F. We do not know its period of ratation as yet and must wait for what the 200 inch Hale telescope may tell us.

* * *

DISTANCE—Again without expiaining the method of calculating its distance we simply say that the latest figure for its mean distance is close to 3,700,000,000 miles or about 40 times the distance of the earth from the sun. The sun's appearance from there would be similar to our view of Sirius but not so brilliant since the sun is yellowish in color. The amount of sunlight received is only 1-1,600 of what we receive per unit area. This, of course, accounts for its frigid condition. It cannot be seen without powerful telescopic aid.

THE ORBITAL PATH — Th planets cannot have orbits in th form of closed plane ellipses be cause the sun is moving throug space at 12.6 miles per second an is carrying the planets with it s that their paths of revolution ar helical in shape. Pluto's path i an extremely elongated helix which requires 248 years for its completion and since it is keeping abreast with the sun it must travel as far as does the sun in those 248 years which amounts to about 98,600,000,000 miles. To this we must add the extra distance Pluto travels in revolving around the sun. The geometry of the cylinder shows that we must add about 2,800,000,000 miles so that Pluto's total distance covered in one revolution amounts to about 101,400,000,000 miles instead of the 23,250,000,000 as given for its plane orbit.

To accomplish this Pluto must travel at 12.8 miles per second which is over four times the 3 miles per second given for the plane orbit and when we consider the distance we find that it also is over four times as great. It looks as if other planets outside Pluto cannot exist because Pluto is traveling only 1-5 of a mile per second faster than is the sun and if a planet were traveling that much slower it would be moving at the same rate as the sun and could not revolve around it.

NEPTUNE'S relation to Pluto —In our remarks above we have discussed the effect of the sun and Uranus on Pluto. We shall now say a few words about the unusual relation of Neptune to Pluto. In 1946 Neptune crossed the path of Pluto, something no other planet can do to any other planet, but at the point of crossing there was no collision because Neptune was over 200,000,000 miles below Pluto.

Neptune is proceeding on its way to its aphelion point which is its farthest position from the sun, and, strange to say, the perihelion point of Pluto's path is very close to the same place so that Neptune, in 1989, will be about 100,000,000 miles outside Pluto's path. In another 43 years Neptune will recross Pluto's path and be again inside without having encountered Pluto on the way.

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OUTLINES

XIV

An Introduction to the History of Art

Art in the proper sense includes architecture,sculpture and painting and is divided into three periods like history:- Ancient,from 5,000-B.C.-476 A.D. Mediaeval,from 100A.D.- 1453A.D. Modern,from 1453 A.D.- 1953 A.D. Ancient art began,no doubt,in Babylonia. Among the various nations that lived in the beautiful Babylonian valley from earliest times the most primative was the Sumerians whose historical records are very meagre. They didnot wish to haulstone building material for hundreds of miles so they simply made clay bricks and dried them in the sun. With this rather poor substitute they erected mamoth temples,palaces and tombs but none of the earlier structures remain because they were under the yoke of their powerful neighbor the Assyrians. When Nebuchadnezzar conquered Assyria he undertook a great architectural program and during his reign he erected his 100-acre imperial palace,the Temple of the Spheres,the Hanging Gardens and repaired the vast walls of Babylon. This was the golden age of Babylon.

Babylonian sculpture is divided into five stages:- Primitive,Archaic, Developed, Decadent,and Neo-Archaic. In the Primitive the style was crude and clumsy;in the Archaic there was an advance in style and method; in the Developed period there was a great improvement in the form of monumental sculpture in the reign of Hammurabi;in the Decadent period little was done except by way of minature work for decoration; and in the Neo-Archaic period there was a revival of the most ancient type but brought to its glory under Nebuchadnezzar's patronage.

The painting of Babylonian artists has all been destroyed or has not yet been discovered. There is still much to be done in this field.

In Egypt we find the next most ancient monuments of our race in the form of temples,palaces and tombs. The temples include the famous Hall of Karnak at the more famous city and capital of Thebes,and the renowned Ramesseum at Ipsambul Nubia. The palaces include the magnificent one of Luxor also at Thebes and numerous royal residences, The tombs include the 67 pyramids,the largest being Cheops that covers 13 acres and stands 418 feet high,also the Tombs of the Kingswhere recently Howard Carter discovered the burial place of King Tutankamen.

Egyptian sculpture is seen in the ornate embellishment of these edifices with inscriptions,relief carvings and gigantic statuary such as the 75 foot seated statues of Rameses II at Ipsambul. They also set up many lesser monuments,which stand in memory of great events, such as the two seated statues of the god Memnon, many oblisks,sphinxes and multitudes of statues of their gods.

Painting in Egypt was not developed and was used mainly to tint walls for interor decoration. Much minute painting was done on the wrappings of their mummies and some on the huge pillars in the great Hall of Karnak.

In Greece the fine arts have,even in ancient times,been both the inspiration and despair of all amateurs and the marvel of antiquity. The architecture is unique in that it has set a threefold style for columns - the Doric,a plain, severe,heavy looking design used mainly in the very large buildings such as the temple of the Delphic Oracle, the Parthenon on the Acropolis at Athens, the vast theatre of Dionysus, and the Mausoleum at Halicarnasus in Caria, one of the seven wonders of the ancient world; the Ionic, a simple but very beautiful design used mostly in their palaces and residences;and the Corinthian, a rather elaborate form used in their smaller edifices.

Greek sculpture surpasses all others,ancient or modern, and was so highly developed that busts and statues were rather common in the streets and squares while masterpieces by great teachers could be found in several of the schools or private studios of outstanding sculptors. We have neither time nor space to list them all but will mention a few of the most famous such as Phidias who carved the remarkable interior of the Parthenon and the costly statue of Zeus; Polycletus and Praxiteles,Lysippos and Skopas,and Chares who produced the bronze Colossus at Rhodes, another wonder of the ancient world whose thumb was thick as a man's body.

Most Greek painting has been destroyed or has not yet been discovered, but we have the names of a few of the most famous wielders of the brush such as Polygnotus who painted the "Fall of Troy" and "The Battle of Marathon"; Zeuxis who painted the Grapes, and Parhassius who painted the Curtain; and Apelles who was made court painter to Alexander the Great and called the Raphael of antiquity.

In Italy what is called Roman art covers a period from about 300 B.C. to 476 A.D. and is simply Greek art spoiled by extravagance. The architecture of the Romans was huge and elaborate, even gaugy in some respects. Their great buildings were temples, palaces, theatres, amphitheatres, and gigantic public works. These large structures were made possible by the use of the arch which was unique with them. Their greatest temple was the Capitoline on the hill at Rome whose roof alone cost 20 million dollars in our money; then there was the Pantheon, the temple of all the gods, whose dome was 140 feet across and cast in a single piece of concrete; Of public buildings the Circus Maximus was 1800 feet long and 600 feet wide and could seat 250,000 people; there was also the famous concrete theatre of Vespasian called the Colosseum which held 90,000 spectators; Of public works the most important were: the great Aqueduct of Claudius, the numerous sumptuous Baths of the various Emperors together with their imperial palaces of which the Golden House of Nero was the most stupenduous mansion ever built by man. There were also the magnificent triumphal arches of Titus and Constantine as well as many fine mausoleums, the greatest being built by Hadrian, which today is called the Castle of St.Angelo.

Roman sculpture followed the Greek so closely and was so multitudinous that we do not need to discuss it here except to say that to the very practical Romans the art of sculpture seemed to be merely a vocation for slaves. They therefore got what they wanted from the Etruscans in northern Italy or the mediocre Greek sculptors in the south, where a number of shops sold terra-cotta busts and statues.

Roman painting, like that of the Greeks, has either been lost, destroyed, or has not yet been discovered except as recently unearthed at Pompeii near Rome.

MEDIAEVAL ART 100-1400 A.D.

The scope of Mediaeval Art includes Early Christian Art, Mohammedan Art, Romanesque Art, and Gothic Art.

In the period of early Christian art there was nothing of merit in architecture because of the pagan religion of the people but the popularity of Christianity was gradually gaining ground in spite of persecution, so much so, that by the year 328 A.D. the Emperor Constantine the Great decided to make Christianity the official religion of the empire. Almost immediately hundreds of pagan temples were closed and scores of Christian churches were being built, curiously enough, out of the materials of these neglected temples. Sculpture too was almost nil because the builders simply took what they could pick up except that they cast aside anything that was purely pagan. There was some small carving and painting done by the hated Christians in the catacombs beneath the city of Rome, but there was no opportunity for true art of any kind to flourish.

ammedan Art -- When Rome had to give up, the city Constantinople became the capital and thither flocked the artists but the terrible conflicts with Iconoclasts, the image breakers, and the constant raids by the barbarians made artistic development impossible for about 500 years. Then came a revival of art under the so-called Macedonian Dynasty, which however, on account of the oriental love of color rather than form, did not amount to much, and in 1204 A.D. Constantinople was taken by the forces of the fourth Crusade, and from that time until it finally fell into the hands of the Turks in 1453 A.D. there is nothing of importance to study except some specimens which were carried away by or sold to various Italian traders.

Romanesque Art -- In Italy after the fall of Rome there arose a somewhat different form of art expression called the Romanesque but throughout the country everything was at a standstill on account of the depredations of the barbarians but before long three new styles fostered by groupes in four main sections - in the North the Lombard style, in the East the Tuscan, in Rome the Basilican, in the West no progress was made until the year 1000 when the powerful dukes of Normandy began to take a personal interest in artistic matters. Romanesque sculpture was rather grotesque in style until about 1200 when Pisano opened his school in Pisa. Painting

Romanesque painting too was at a low ebb until a very gradual return to full tide under such artists as Cimabue in 1240, Giotto in 1266, Fra Angelico in 1387, and Botticelli in 1444.

Gothic Art -- From about 1100 to 1453 A.D. In Gothic art and especially in Gothic sculpture we have a really new creation because the artists and builders took their inspiration from the tall trees of the forests. Their lofty branches interlaced far over head led the artist to choose a new medium for his great skill and thus produced a new type of architecture which was used in almost all of the fine cathedrals one may see in England and Europe today. Sculpture naturally kept pace with building while painting followed closely as an obedient assistant.

MODERN ART 1400- the Present time.

The period of modern art really began toward the end of the Renaissance about a half century before 1400 because no definite line could be drawn on account ofthe peculiar transition which was taking its own time.

In Architecture the most prominent style that developed during the closing years of the Renaissance was the Neo-Roman under Brunelleschi,Alberti,Palladio Bramante,and Michaelangelo. These men studied the great structures of the old days and,having imitated them,adorned them with elegant sculptural details which may be seen in hundreds of palaces,cathedrals and great civic buildings. In Italy the best were the Duomo by Brunelleschi, the Ruccelai Palace by Alberti,and Saint Peter's Cathedral by Michaelangelo. In France,where some changes in style were made, we find the Louvre Museum,the Luxemburg Art Gallery,and the Pallace of Versailles, In Germany there are princly castles like the famous Schloss in Heidelburg, and a large number of city halls like those in Bremen and Augsburg. In England the style was not highly developed but there is one unique example in the wonderful Saint Paul's Cathedral by Sir Christopher Wren in London. Since 1700 there has been but little advance in style but many grand buildings have been erected. In France there is the beautiful Opera House in Paris, in Austria the Houses of Parliament in Vinna, in Germany the National Museum and the Court Opera House in Berlin, and the great Walhalla at Ratisbon,a copy of the Parthenon at Athens, in England the Saint George's Hall at Liverpool and the Houses of Parliament at Westminster, and in America there is the Capitol in Washington and,the new departure in building science,the mushroom sky-scraper such as the Empire State Building,in New York.

In Sculpture ,during the Renaissance, the demand for sculpture was mainly ecclesiastical and the subjects included almost everything that would lend itself to decoration. In Italy there were a number of schools of sculptors such as the Florentine school in which we find Ghiberti,Donatello,Luca Della Robbia and Desiderio. There was the Roman school with Michaelangelo at its head and Cellini as leader of the popular bronze workers. There were schools in Milan,Venice,and Padua all centres of much artistic achievement,and in France there were similar schools at Tours,Troyes, and Toulouse, while over all there was the active interest of Louis XIV. In Germany, Spain and England various schools arose but their work was very similar to that of the French sculptors. In Denmark we find the famous Thorwaldsen whose remarkable statue of Christ alomg with his apostles may be seen in Copenhagen. Since the close of the Renaissance era a distinct change in style occurred so that sculpture became less ornate and more like the clasic style of the ancients. Religious themes were almost neglected and the sculptors were kept busy erecting hugh monuments and carving statuary of a national character in commemoration of great events and great men, in history,in art,science,literature,medicine,music,invention and discovery. In Italy a new classical school was set up by Canova; a romantic school by Ricci and a realistic school by Dupre. In France there was a classic school with Chaudet in charge, a romantic school with Preault as leader, a realistic school with Rude as leader,an academic school with Paul Dubois at its head,and finally a naturalistic school led by Rodin. In Germany we also find a classical school under Dannecker,a Berlin school under Schadow, the Dresden school under Rietschel, the Munich school under Eberhard, and the realistic school under Rauch who designed the monument of Frederick the Great in Berlin which is said to be the finest piece of German sculpture. In England,as on the continent, there was a classical school led by Sir Richard Westmacott and a Modern school led by Alfred Stevens who was followed by the sculptors of our own day, Onslow Ford, Thornycroft and Gilbert. In America there was a classical school under Greenough, while the well-known Crawford, Powers, St. Gaudens, French, Bitter, MacMonnies, Boyle and Barnard formed the more modern group, but not the ultragroup.

In Painting there is no distinct break from the Renaissance styles but the invention of oil painting by Jan Eyck of Flanders about 1390 A.D. made a great difference in the material and the method of painting. Before this time the artists used water or the yolks of eggs to mix their colors, but now a new day had dawned and Jan and his older brother Hubert painted the famous "Adoration of the Lamb" at Ghent, and a little later we find Memling and Mabuse painting many fine portraits. But, as in architecture and sculpture so also in painting, we find the greatest names in Italy, so now we must turn to the Florentine school of artists which includes such names as Leonardo da Vince who painted The Last Supper and the Mona Lisa which is said to be the finest example of portrait painting in the world. Next is the one and only Michaelangelo, painter as well as sculptor and architect, who decorated the ceiling of the Sistine Chapel in Rome with the greatest series of paintings in the world. During the same time there arose the Divine Raphael, a remarkable youth who almost equalled Angelo but died at the early age of only 37. There was also the school at Padua with its boy genius Mantegna ; then the school of Modena with the great Correggio, builder and decorator of the cathedral at Parma, then the school in Venice with the Bellini Brothers, and finally that illustrious group of painters made glorious by the presence of Titian, Paul Veronese, and Tintoretto who painted the largest picture in the world. In Germany we find the wonderful wood engraver Durer, and the great portrait artist Holbein. In Flanders we find Van Dyck, Hals, Rembrant, Paul Potter, and Rubens tha great colorist. In England we meet Hogarth, Sir Joshua Reynolds, Gainsborough, Romney, Wilson and Lawrence. In America as I write there are many painters including Gilbert Stuart, Morse, Sully, Cole, Chase, Durand, Harding, Fuller, Sargent, Abbey, Inness, Wyant, and a very few moderns.

If you have read this brief introduction with interest may I suggest that you follow it up by reading slowly a good history of art which includes Architecture, Sculpture and Painting.

W.G.C.

AN OUTLINE OF LAW

(Before Blackstone)

The primary meaning of the word Law is a written rule of action laid down by recognized authority, and supported by suitable sanctions.

The beginnings of law are found in social habit and custom,and the basis of law is found in precedents which are the result of judicial decisions.

In early social custom law was mingled with morals and religion or only slightly differentiated. In fact they are fundamentally related.

Now since precedents are the basis of law it became necessary in early times for communities to set up certain well-informed and well-balanced persons to pass judgment on cases which were constantly coming up for settlement and thus more precedents were established and gradually the great body of Common Law came into existence.These judicial decisions became binding as soon as they were clearly understood by the community as being in the best interests of all concerned,then certain punishments were attached to them by common consent.

After many generations of such community understanding and the growth of a large body of these decisions we see the rise of various kinds of tribunals of justice in different countries which gradually became Courts of Law.

The history of law then dates back to a very early time. There were laws long before the famous Medes and Persians made theirs. The oldest intelligent code was that of Hammurabi about 2250 B.C.in Babylon. This code contains laws regarding land,rent,police,bootlegging,agriculture,loans,wages,debts,sales,judges,justice, witnesses,parties,crime,punishment,divorce,marriage,parents,children,adoption, and inheritance,etc,etc,etc.

In Egypt about 2,000 B.C. there was an established government which was overthrown by the notorious Hyksos Kings who established the so-called Middle Empire as the 17th.Dynasty. Abraham visited Egypt in 1900 B.C. Joseph in 1700 B.C.and Jacob in the same period and found a well developed government,until a group of localprinces united and overthrew the Hyksos and formed the New Empire. In 1400 B.C. Rameses I established the 19th.Dynasty to be followed by his son Seti I and his very famous grandson Rameses II who reigned for 67 years and 'knew not Joseph'and oppressed the Hebrew people with very rigid laws as found in the Book of the Dead. In 1300 B.C. Moses was called to lead these people out from Egypt to the Promised Land and was given,by Divine command,a new series of regulations for their guidance. These are contained in the Old Testament Law which has been the source of inspiration for all Christian Law since that time.

The Assyrians did not leave much in the way of legal information for later generations and no doubt followed as closely as they wished the laws of Babylon. They cared little about regulations for themselves but were exceedingly drastic in their punishment of common law-breakers and even more cruel to their captives in war.

The Greeks claim to have had,in their very early days,a great law-giver called Lycurgus but we cannot be sure of this. Later,about 600 B.C. we find Draco and Solon as truly great law-givers,but although most of their work has disappeared, we feel sure that the splendor of ancient Greece was due to a careful observance of well formulated regulations. Such statesmen as Clysthenes,Pericles,and Aristides were the product and also the producers of very excellent legal codes.

The Romans surpassed all other nations in the science and art of law-making. The empire and law were their chief interest and study. From the time they finally got rid of the villainous Tarquins about 500 B.C.we read of Cincinnatus the Dictator, the Decemvirs and the 12 Tables of Laws,the Tribunes,the Censors and the long list of great lawyers like the Gracchi Brothers,Cicero,Hortensius,and finally the great school of Roman jurists which flourished between 100 B.C. and 250 A.D. and who created the most remarkable Law Literature ever produced by any people. Later in 527 A.D. Emperor Justinian of the Eastern Empire ordered a complete collection of all Roman Law which became known as "The Body of Civil Law" for all Roman citizens.

English Law is a combination of the best from ancient legal sources coupled with a carefully analyzed body of home-made legislation very skilfully summarized,restated and brilliantly commented upon by the famous English jurist William Blackstone about 1750 A.D. English law is of various kinds arranged in two classes:- Substantive laws which define our normal social relations; and Adjective laws which define abnormal conditions e.g. violations of the established rules of our social order.

Substantive law is divided into Public law and Private law. The former is concerned with government and its various relations such as constitutional and administrative matters and also international affairs. Private law,like Substantive law,is divided into Personal law and Property law. The former is concerned with personal rights such as ones belongings,ones family,and the settlement of succession,together with what has been established by previous legal decisions. Property law has to do with things,possessions,debts,contracts, patents,etc. Under this same head there is Family law which includes the relations between husband and wife,parent and child,master and servant. The Law of Succession has to do with the normal disturbance due to death and provides for proper adjustment.

Adjective law aims to restore the normal social order when it has been disrupted by negligence or criminal action. It includes not merely the process of punishment and redress,administrative,civil and criminal procedure but also the body of rules which define and classify offences and prescribe penalties. Just recently we have heard a good deal about Criminal Law which is a section of Adjective Law whose field is divided into offences against government,public peace,public health,public safety,religion,morals,persons,property,etc.etc. The English criminal law has been adopted by the states south of us with some modifications and additions,while in Canada it is our pride and protection.

W.G.C.

NOTE :- Let those who may be interested in further information on law pick up the story where Blackstone left off. Make a similar outline down to the present time and add it to the above.

OUTLINE OF 12 LECTURES ON
(ASTRONOMY)

I. General Introduction

Purpose -- The Purpose of our course is to push back the frontiers of our knowledge of the universe by eliminating false notions and learning the true interpretation of what physical facts we may obtain by observation and what other well substantiated ideas we may accept.

To become acquainted with the heavens by understanding the true relation between the fixed celestial equator and the ecliptic circle and its zodiac.

To be able to point out the constellations at any time,day or night,any month or year,and to name the brightest stars and describe them.

To discover the distinction between the Solar System and the Stellar System and to name,locate and describe each ~~one~~ cluster that may be visible on any night.

To understand some of the simpler laws of motion e.g.Rotation,Revolution, and retrogression and be able to distinguish between star and planet motion.

To sense the magnitude of the earth,the Solar System,the Galaxy and the Universe and to find our place in their midst.

To gain a working knowledge of the basis of astronomical measurements and the mathematical methods employed in geometrical computations - angles,degrees,etc.

Methods -- The Methods usually followed are similar to the purpose stated above i.e.we undertake the easier studies first and attempt the more difficult ones as we gain experience and add to our store of knowledge.

We shall buy or borrow the books we may need - some for information, some for lecture notes and some for extra reading and some for diagrams and pictures.

Each student will obtain as much instrumental equipment as he can afford because these accessories are necessary to the understanding of difficult items.

The students shall read slowly the Preface and the Introduction of each book and its list of Contents and the Index,and carefully examine its illustrations.

All students are expected to make,copious notes of each book,each lecture and keep a diary of any astronomical data that comes to their attention.

At the close of this introductory lecture we shall discuss any matters which require further elucidation and at the end of the course the same opportunity will be given to the entire class.

Observations -- Observation includes a painstaking study and a careful operation of each aid and instrument obtained for demonstration purposes,being extra careful in handling lenses or mirrors.

Since photography has become so very important in astronomy one must also be particularly careful in use of films,acids and lights.

In observing it is necessary to first make a general examination of the sky to get one's true layout of the ~~sky~~ sky's and the orientation of its chief circles.

To become acquainted with the main constellations by name and relation to those nearby,as well as the brightest stars in each with name and distance.

To learn the names and the positions of the planets and how to follow them across the sky through the months,and watch for meteors and comets.

To make a star-map of each constellation as the months go by and determine which group holds the earth and which the sun at any time.

To observe any eclipses of the sun or the moon,and any aurora borealis or any unusual meteor fall,remembering that they are within the earth's atmosphere while the stars are exceedingly far away from the earth.

Definitions -- It is very important that students commit to memory many very brief statements which clearly distinguish objects and ideas. These will be drawn up as the class needs them and each one will keep a copy.

Lecture II, The Sun

Its Age - The origin of the Sun is a profound mystery unless it was created, and the Creator also created the process of development we call evolution which has nothing to do with the origin of anything but only with its unfolding. Its age isn't known but from certain estimates from modern science it is about 3 billion years old.

Its Distance - This has been recently determined as close to 93,000,000 mls. and this is called the A.U. the astronomical unit which, if travelled at 1,000 miles an hour, would require about 10 years in the wintertime.

Its Diameter - This also has been recently redetermined at 864,000 miles, At 4 miles an hour it would take fully 80 years to walk around it. This is 109 times the diameter of the earth. It is a large sphere of gas but a rather small star.

Its Volume - This is its spherical contents which is about 340 quadrillion cubic miles or 1,300,000 times the size of the earth, Think of a sphere large enough to hold that many earths.

Its Mass - This is 333,000 times that of the earth which is often expressed in tons. The earth weighs 6 sextillion tons, the sun over 2 octillion tons. To move it away at one ton per minute would take - how long?

Its Atmosphere - This is composed of metalic gasses in the form of several spherical concentric envelopes. The outmost is the Corona, then the Chromosphere, the Reversing Layer, the Photosphere, then the Spots, the Prominences, and over 60 elements.

Its Light - This is said to be some 3 octillion candle power expended each second and that it weighs over 4,000,000 tons. Yes light has weight. Its spectrum reveals the nature of the atmosphere and much beyond the visible band.

Its Heat - This has been measured at 900 sextillion calories per second. Its surface temp. is 10,500 degrees F. and still hotter as we penetrate toward its centre. It has been said that if its entire heat were focused on a sphere of ice the size of the earth, it would melt in less than a minute.

Its Energy - This is said to amount to 500 sextillion horse power per second but our share is only 230 trillion h,p. but we have not yet learned to catch, keep, and use it. On each sq.yd. of sunlit surface there is delivered 50,000 h.p. in 10 hrs.

Its Family - The Solar System is composed of planets, satellites, planetoids, comets and meteors together with vast bodies of cosmic dust and many kinds of gas which are afloat in the unlimited areas of the universe.

Its Motions - These are of two kinds :- The unreal or apparent and the real. The apparent daily and yearly journeys, the proper motion, the galactic rotation, and the motion of the expanding universe.

Its Future - The past, present and the future of the sun and its System have always been very intreguing topics. The latest guess stands at about 15 trillion years but no one takes this seriously, so lose no sleep.

The eclipses of the sun and the moon will be covered in a later lecture.

Lecture III The Planets

Consult my booklet "Solar System Data" for physical features and several other matters such as orbits,motions,periods,conditions,and configurations. Then lookup the story of man's knowledge of them,and commit their names to memory. Discuss the methods of measurement,proofs of motion,their helical paths and their orbital velocities as well as the influence of the sun upon them.Solar Transits.

Lecture IV The Satellites

Consult the same booklet for their number,size,distance,discovery,name and do not fail to include the latest additions. Observe the total,partial,and annular eclipses of the sun by our earth satellite the moon. Of these there must be two of the sun by the moon and maybe two of the moon by the earth. The most in a year will be seven,five of the sun and two of the moon,or four of the sun and three of the moon. Then there is the Saros Cycle,a period of 18.6 years at the end of which the eclipses are repeated but not at the same places on the earth.

Lecture V The Planetoids

Consult the same booklet for their mythical names,their numbers,sizes and distances of the five best known ones. At present there are about 1500 discovered. Discuss their use in determining the sun's distance. Make a list of as many as we can find reported in astronomical literature.

Lecture VI The Comets and Meteors

Consult the same booklet for their finder's names,their unusual dimensions, their meagre masses,their light,speed and motion,and the cause of their tails. I shall never forget observing the Great Comet of 1882and photographing the Whipple Comet of 1943 with the Schmidt Camera at the U.W.O. observatory. The Meteors are undoubtedly residual cosmic matter which is being slowly gathered by the attraction of the planets and the satellites. Like the comets they are named for their finders and when they reach the earth they are called meteorites.

Lecture VII Our Stellar System

Consult my booklet"Know Your Stars" and my article on "The Universe and its Stars"in Chapter IIof this biography,and also your class Text-Book. The system we are to discuss is the one in which the earth has its place. It is no doubt a Spiral in form and contains billions of stars as well as vast bodies of gas and dust.There are many constellations of which we have never heard and perhaps solar systems similar to to ours and with inhabitants too. Its diameter,distance,velocity of rotation, and motion.Is it comming toward us or departing from our position in space?

Lecture VIII The Universe

Consult the same booklet for concise information about it.

Lecture IX Theories of Creation

Consult the same booklet and my Theology booklet Chapter XIX.

Lecture X Religion and Science

Consult "God and the Astronomers" by Inge and other similar books.

Lecture XI Astrology and Astronomy.

Consult two or three Encyclopedias and Scientific Modern Astronomy.

Lecture XII Question and Answer Period,

Consult your NOTES and discuss freely each proposition presented.

W.G.C.

An Introduction to Literature

Literature is the complete body of literary productions embracing all the results of knowledge and imagination preserved in writing.

Since much of literature is history and the making of it is an art we shall divide it into three periods like history and art.

Ancient literature then extends from earliest times to the fall of Rome in 476 A.D. and includes Babylonia,Egypt,Palestine,India,China,Greece and Rome. The earliest literary remains thus far discovered were nothing more than mere scratches on smoothed rock faces,then curious markings on clay tablets,skins,or papyrus. Some of these have been preserved through the centuries and now may be seen in museums. They are records of wars,government,agriculture,customs and religion.

Babylonian literature began very early,perhaps a century before any other tribal group, for the clay tablets recently found show evidence of this from the fact that they contain a highly developed mythology,astrology and history. We do not need to spend much time here since the writings thus far discovered which belong to the most ancient times,are very meagre and difficult to decipher.In later times the changing nationalities of the Babylonian area developed a large amount of literary material written in wedge-shaped (cuniform) letters and covering such matters as household affairs,business deals,correspondence,religious practice and education as well as marriages,banquet preparations etc.

Hebrew Literature began like the other ancient nations with crude forms and queer drawings but as time passed and other peoples mixed with them their way of communicating gradually changed and by about 1,300 B.C. they had begun to compile material for books such as we find in the Old Testament, Then came the Prophets between 800 and 400 B.C. and later the Midrash or explanations by Ezra and others.Then the Apocrypha or uninspired books of some great Jewish scholars. Then the Talmud which is composed of the Mishna or text and the Gamara or commentary on Jewish law.Finally there are the Targums or portions of the Old Testament.

Egyptian Literature at first took the form of scratched,carved or colored pictures called hieroglyphs which simply means sacred carvings usually done on the walls or pillars of their temples or the tombs. Later the priests wrote with bamboo pens on papyrus a kind of paper made from the reeds of the Nile. Their earliest books were thus rather crude and the oldest one that has come down to us,said to be the oldest book in the world,is entitled,"The Precepts of Ptah-Hotep" who lived about 2550 B.C. It was written on a piece of papyrus 23 feet long and 5 feet wide in the form of a scroll which is in the Paris museum. The next great old book is the remarkable,"Book of the Dead" written at the time of the great pyramid about 2700 B.C. and containing poems,prayers,and descriptions of the experiences that await the dead in the next world. The Egyptians had also a god of books called Thoth who was lord of the hall of books. In later times the priests wrote on law,morals, rhetoric,arithmatic,geometry,medicine,travel and religion.

Oriental Literature includes Persia, India, and China. The first was India with its two popular cults:- Brahmanism and Buddhism,the former religious and philosophical;the latter moral and social. Brahmanism began about 1500 B.C. but its author has never been discovered,its sacred books are the famous Vedas composed of hymns, prayers,poems and philosophy in which we find the doctrine of the one great Spirit which expresses itself among men as Brahma the creator, Vishnu the preserver,and Siva the destroyer, Besides these there are 33,000 other lesser gods. It teaches the idea of the transmigration of souls,and Karma which is reabsorption of the human spirit into Brahma,and therefore the complete annihilation of individuality. Buddhism was introduced by Gautama Buddha about 500 B.C. He was a young Hindu prince who gave up his throne to go out and help his fellow men. He said man must overcome the three basic desires of his nature that lead to sin. He had no temples,no sacrifices and no priests but his followers spread over India,China and Japan.

The second was Persia with its great teacher Zoroaster about 1000 B.C. whose 20 books were written on 12,000 cowhides. His most important book was the Zend Avesta,containing hymns,prayers,legends,poetry and songs. He taught that there is a constant battle going on between two great spirits for supremacy in the human soul and prophecied that the good would win over the evil one.

The third was China where side by side two great cults held sway and are still contemporary,they are Confucianism and Taoism. About 550 B.C. Confucius a philosopher gave to his followers a clearer idea of what their ancestors taught and in this effort he laid the foundation for morals, government,and literature in later China. His wisdom is contained in 5 Books on history,poetry,changes,rites and seasons. A contemporary writer and teacher undertook to teach the doctrines of Taoism. His name was Lao-tse whose book entitled,"The Rule of Reason and Virtue" became the religion of much of the empire. The Chinese are about as philosophic as they are mystic so the teaching of both have gone on side by side for centuries.

Greek Literature like Greek art is almost perfect in symmetry,proportion, clarity,and strength and is divided into three periods or ages:- Ionic,Attic and Alexandrian. The Ionic Age began about 800 B.C. when Homer the blind minstrel travelled up and down the country singing his remarkable war songs which he had gathered from many sources and had pieced together with some of his own. His Iliad is an epic poem rehearsing the trials of the Greeks in the Trojan war while his Odyssey,another epic,recites the wanderings of Ulysses in search of his home after the fall of Troy. Both poems are replete with references to the myths of earlier days whose authors are unknown. The next was Hesiod the poet of nature and real life who wrote "Works and Days".Then Pindar the great Lyric poet,and Sappho the renowned poetess of love. There were also several famous philosophers like Thales the father of philosophy and six others called the Seven Sages of Greece, they were Solon,Pittacus,Bias,Chilon,Cleobulus,and Periander.

The Attic Age began about 475 B.C. snd is also called the Golden Age of Greece. During this period,closely following the Persian wars,we see Greecian culture at its height - history,oratory,poetry,philosophy,and drama,together with architecture,sculpture and painting,all flourshing in unusul vigor. There was the father of descriptive history,Herodotus;the father of philosophic history,Thucydides; and the great general,Xenophon the author of the "Anabasis". The best known orators were Pericles the ruler of Greece; Themistocles the astute statesman; Demosthenes the greatest of ten great orators; The foremost philosophers were Anaxagoras who taught that "Reason rules the World";Empedocles the first to suggest the idea of evolution; Democritus whose theory of atoms led to the nebular theory of the universe; Socrates the wisest; Plato the broad-browed; and Aristotle the deepest. Besides there were three schools:-The Sophists led by Protagoras;the Stoics led by Zeno;the Epicureans led by Epicurus. The Drama was divided into two parts:Tragedy and Comedy.Of the former the leaders were Aeschylus the father of tragedy; Sophocles the preacher of tragedy;and Euripides the teacher of tragedy. Of Comedy the more important were Aristophanes the father of comedy,and Menander the popular writer of comedy. The great sculptors of this period were Phidias, Polycletus and Praxiteles; while the most prominent painters were Polygnotus, Parhassius,and Apelles.

The Alexandrian Age from about 300-146 B.C. when Greece fell under the power of Rome. During this period Alexandria in Egypt was the centre of Greek life and literature which now took the form of study, translation and compilation. It was here that in 277 B.C. a group of seventy scholars translated the Old Testament into Greek. It was here too that Manetho wrote his History of Egypt from the monuments,and Berosus compiled his "Chronicles of Chaldea". Here we find the celebrated school of mathematics with Euclid at its head. Of astronomers there was Aristarchus who first discovered the Heliocentric theory of our Solar Systemand Hipparchus who calculated eclipses and cataloged the stars. In Sicily we find Theocritus the only great poet of the period and the famous Archimedes who discovered specific gravity and the power of the lever. Note- This topic should be followed up in a good encyclopedia.

Roman Literature -- The Romans were different from the Greeks, they loved to fight and rule,they enjoyed the real tragedy of the gladitorial combats on the fields of battle. They were a practical people,haughty,selfish,and cruel,but as the years passed they too developed a great literature that commands our attention.In it there are four periods:- the heroic,the drama,the golden,and the silver ages.

The Heroic Age from 700-300 B.C.During its earliest period there was the development of myths,myth hymns, ballads and songs which were repeated by minstrels and finally gathered in the literary works of later writers who added much from both native and foreign sources. For example there were such myths as the birth of Romulus, the pride of Tarquin,the death of Lucretia,and several others.

The Drama Age from 300-146 B.C. shows some names of first rate like Livius Andronicus the father of Roman drama, Naevius the writer of comedy, Ennius the author of the great epic"The Annals of Rome",and Plautus who copied the vulgar humor of the Greeks, and Terence who copied the refined humor of the Grecian ~~com~~ comedies,then there was Lucilius the poet-satirist of the Republic, Catullus the Roman Burns, and Lucretius the poet of science who ridiculed the gods.

The Golden Age from 50 B.C.- 17 A.D. The literary writers of this period had the popular patronage of Augustus and his wealthy minister Maecenas and were thus able to do much better work; at the same time we remember the great poet Virgil whose remarkable epic "The Aeneid" which tells the story of the wanderings of Aeneas and his companions after the fall of Troy. Then there was Horace highly honored for his simple verses in the form of odes,satires and epistles,and next was Ovid the scholar poet who wrote the "The Metamorphoses" a story poem about the creation of the world from a mythical point of view; then Persius the satirist who protested against the vice and crime of Rome; The foremost orators were Hortensius the lawyer and Cicero the statesman who was also the most famous prose writer of Rome; finally there were at least three historians of note:- Sallust who wrote the "Conspiracy of Catiline" ; Livy who wrote his "Annals" a history of Rome; and Tacitus the author of "Germania", the "Life of Agricola,and ahistory.

The Silver Age from 17-120 A.D. During this period we observe the great decline which continued until the fall of the empire. A few great names however demand our attention. There were Suetonius who wrote the lives of twelve Caesars; Seneca who was a moralist but a Stoic; Varo the most learned of the Romans; the two Plinys of whom the elder was uncle of the younger,the elder was a great naturalist who died at the eruption of Vesuvius which destroyed Pompeii.His Natural History of 37 volumes became the Encyclopedia of Rome. His nephew who wrote epistles,poems,histories and tragedies.He was also an orator and delivered a eulogy on the Emperor Trajan; then there was Marcus Aurelius the emperor and Epictetus the philosopher and finally Quintilian whose fame as a grammarian and rhetorician out-stripped all others. about A.D.50.

And now the light fades and we are to enter the dark valley of Mediaeval times but the dawn of Christianity appeared, and gradually brightened with power and popularity and the production of several very important writers such as Clement of Rome, Clement of Alexandria, Justin,Origen, Eusebius, Chrysostom, and Basil. Besides these there were two who deserve special mention namely Jerome who translated the Bible into Latin called the Vulgate version used by the R.C.church,and Augustine who wrote his "Confessions" and "The City of God" two remarkable books. Roman Law and its voluminous literature printed in 12 Tables became the guide of the decaying empire. 450A

→ We come now to the time of Modern Literature which extends from 1453 A.D. when the Turks captured Constantinople,to the present time. But before we proceed let us clear up the 1000 years between 453 and 1453. These were called the Dark or the Middle Ages which were marked by the development of a lowered type of citizenry on account of the admixture of foreign peoples after the fall of Rome. About 1500, however, there was a rebirth of interest in art and literature which we shall now follow to and through the Renaissance,but with reduced data.

In Arabia at about 570 A.D. we find Mohammed and later his notorious Koran which was published in 635 A.D. In Italy about 1265 A.D.the illustrius Dante produced his "Divine Comedy"; and in England at about 1350 Chaucer appeared with "Canterbury Tales"and in 1470 Malory finished his work on "Morte d Arthur".

An OUTLINE of Literature 4

Modern Literature covers a period from 1453-1953 and the present time. The capture of the eastern capital mentioned above caused an exodus of Greek scholars to Italy just as the fall of Rome had done 1000 years before when the then scholars of Rome sought refuge and opportunity in the then eastern capital. These artists, sculptors, and writers brought with them the learning of eastern Europe and found the printing-press waiting for them. Inside of 40 years America was discovered and inside of 100 years the Reformation was launched so that there was a new era in the making which became the Renaissance as important for literature as for history, science, and art. Along with the scholars came the monks from the monasteries with their copies of the great ancient classics and many translations together with a continuance of the work of the Christian leaders in Italy. It was here that the magnificent Medicis, the wealthy Borgias, and the Grand D'Estes, already patrons of painters like Michelangelo, Rephael, and DaVinci, now became interested in literature so that we find poets like Ariosto who wrote "Orlando Furioso" a beautiful story of Knighthood; Machiavelli who wrote "The Prince"; and Tasso who wrote "Jerusalem Delivered". 1590

In France the great writers of the Renaissance were Rabelais the laughing philosopher who wrote in his "Gargantua and Pantagruel" a satire about a great king and his drunken son, in which he tried to teach that laughter and wit were the best medicine for all human ills; Montaign who wrote many essays on the folly of fear, selfishness and ambition, and in favor of virtue. Then came Pascal and Descartes the philosophers; Corneille, Racine, and Moliere the dramatists; and LaFontaine and Perrault the story writers.

In Spain from which the Turks had been driven out and the Jews had been expelled, there grew up a new national life in which Velasquez was the great artist and Cervantes the great author who wrote "Don Quixote" to right the wrongs of the world but found it can't be done by satire. But it is said to be the best piece of prose of that period.

In the Netherlands we find Erasmus the finest scholar of them all writing his great satire "The Praise of Folly" which critized the faults of all classes.

In England Sir Thomas More wrote his "Utopia" about a far away island on which lived a perfect human society; William Tyndale and his great translation of the Bible; and Miles Coverdale who printed the entire Bible in English, 1500 A.D.

We have now arrived at the greatest period in English literature, the Elizabethan Age, which has been called the most momentous epoch in all the history of literature. This particular age extends from 1500-1600 A.D. and begins with Edmund Spenser who wrote the "Fairie Queene", Sir Philip Sidney the author of "Arcadia", the Fletcher Brothers, and George Chapman the famous translator of Homer's unusual epic poems. Then came John Lyly and Christopher Marlowe who wrote "Doctor Faustus". But the brightest star was just rising in the world-renowned William Shakespeare, poet and dramatist whose genius outshone them all. His sonnets and other poems are great but his plays are the finest in any literature. There are 33 of them - 6 historical, 8 legendary and 19 ficticious. The rare Ben Jonson followed him with "The Alchemist" and "Catiline"; while Beaumont, Fletcher, Massinger, Webster and Shirley close this school of dramatists. The prose writers come next with Sir Walter Raleigh author of a History of the world; then the translators of the King James version of the Bible; then the great writers on theology like Richard Hooker, Jeremy Taylor, and Richard Baxter; then Sir Francis Bacon the most learned literary, scientific, and philosophic mind of his age. At about the same time the great John Milton began his remarkable career in statesmanship, oratory, poetry and prose and has left to us his immortal epic "Paradise Lost" which ranks with Homer's Iliad, Virgil's Aeneid, and Dante's Divine Comedy as the four greatest epics of all literature; then follows John Bunyan with "Pilgrim's Progress"; John Hobbs the selfish philosopher whose celebrated books "The Leviathan" on government and "The Behemoth" on war were written to offset Milton's great efforts in statesmanship; then came John Locke the father of analytic philosophy; John Dryden whose striking prose, poetry and plays put him in a class by himself; then Alexander Pope author of the "Essay on Man" and the "Dunciad" the keenest satire in English literature; and finally Sir Isaac Newton who has been called the Pride of the human race.

Although the remarkable era of Queen Elizabeth closed, the tide of literary effort in England and the continent became so great that we cannot do more in this outline than give the names of the foremost and their fields of work.

From 1700 to 1800 A.D.

--- In ENGLAND ---

Historians -- Gibbon, Hume, Robinson,
Novelists --- Addison,Defoe, Fielding, Richardson, Smollet, Sterne, Swift,
Essayists --- Steele, Pope, Addison, Young, Lamb,
Poets ------- Burns, Cowper, Goldsmith, Gray, Scott, Sheridan, Thomson,
Hymnists ---- Dodderidge, Bonar, Faber, Watts, The Wesleys,
Theologians - Butler, Paley, Lander, Collins, Toland, Watson,
Dramatists -- Lillo, Moore, Garrick, Cumberland, The Colmans,
Philosophers Berkeley, Hume, Hamilton, Bentham, Mill, Spencer,
Satirists --- Churchill, Burns, Lockhart,
Orators ----- Burke, Blackstone, Pitt, Smith,

--- In FRANCE ---

Historians -- Diderot, D'Alembert, Marmontel, (Encyclopedists)
Novelists --- Flaubert, Hugo, Balzac, Dumas, Daudet,
Essayists --- Pascal, Saint Pierre, Stendhal,
Poets ------- Banville, Gautier, Verlaine, Mallarme, Rimbaud, Merrill,
Theologians - Fenelon, Richelieu, Dormer,
Dramatists -- Augier, Caron, Corneille, Moliere, Racine, Vigny, Scribe, Legouve,
Philosophers Descartes, Mirabeau, Thiers,
Satirists --- Danton, Lesage, Voltaire,
Orators ----- Robespierre, Rousseau, Gambetta,

From 1800 to 1900 A.D.

--- In ENGLAND ---

Historians -- Grote, Macaulay, Hallam, Green, Freeman, Froude, Wells,
Novelists --- Walpole, Austin, Bronte, Thackery, Dickens, Hardy,
" --- Trollope, Collins, Eliot, Stevenson, Barrie, Meredith,
Essayists --- Emerson, Haslitt, Lamb, DeQuincey, Carlyle, M.Arnold, Ruskin,
Poets ------- Byron, Moore, Shelly, Keats, Wordsworth, Coleridge, Southey, Hunt.
" ------- Landor, Hood, Browning, Tennyson, Rossetti, Kipling, Shaw.
Dramatists -- Sheridan, Knowles, Bulwer-Lytton, Talfourd, Shaw, Taylor,
Philosophers Reed, Spencer, Mill, Stanley, Jowett, Miller, Darwin, Tyndall,Huxley,
Orators ----- Pitt, Gladstone, Fox, Spurgeon, Drummond,

--- In AMERICA ---

Historians -- Prescott, Bancroft, Parkman, Eggleston,
Novelists --- Irving, Cooper, Hawthorne, Alcott, Roe, Hale,
Essayists --- Emerson, Thoreau, Curtis, Warner, Stedman, Lanier,
Poets ------- Bryant, Longfellow, Poe, Whittier, Holmes, Lowell, Whitman,
" ------- Stowe, Harte, Cable, Page, Howells, Howe, Field,
Dramatists -- Tyler, Godfrey, Dunlap, Payne, Brown, Boker, Sargent, Belasco,
Philosophers James, Bowne, Twain, Emerson, Pater,
Educators --- Angell, Barnard, Butler, Eliot, Hall, James, Mc.Cosh,
Orators ----- Webster, Henry, Channing, Clay, Calhoun, Choate, Douglas, Bryan,

And now may I remind the reader that this Outline is in no way complete but is thought to be a stimulant toward further search amid the vast wealth of the world's literary endeavors,dont fail to become rich.,

AN OUTLINE OF MUSIC

Sound is the result of vibration. Music is the result of planned vibration. and vibration is the movement of disturbed matter in its natural effort to regain its equilibrium. If the vibrations in an elastic body are slow - say 16 per second we hear a pur,if 40 per second we hear a hum,and as they are increased in rapidity the tones become higher,and if they are increased to 36,500 we hear all the sounds necessary to music. Our teachers tell us that by close attention it is possible to distinguish about 10,000 tones but that thus far in musical development we use only about 90 which cover a range from 40 to 4,000 vibrations per second,or 7 octaves. Every tone is made up of several partial tones,the lowest being the fundamental;the others,overtones. Each tone has also three characteristics ;- Pitch,i.e.high or low; Intensity,i.e.loud or soft;and Duration,i.e. long or short.

These things have been known,in a practical way,since the earliest times when the cave-dwellers or the bush-men answered the echo or their wives crooned to their children, We cannot take time in this brief outline to cover that early stage of music but must content ourselves with the fact that instruments like the drum, the pipe and the lyre have been found in recent excavations;and we remember that, 1,000 years B.C. David played an instrument before King Saul to relieve his muddled mind. He also led the people to play on lyres and harps and tambourines and cymbals and trumpets. IChron.13:8.

The first musical system was invented by the Greeks about 500 B.C. They received suggestions from the Hebrews,the Phoenicians and the Egyptians as mentioned by certain writers of that time but according to Pythagoras the system was quite artificial and complicated.

The Romans followed the Greeks as usual but added nothing while some of the early Christians brought liturgical selections from the temple at Jerusalem an thus prepared the way for later church music.

In 384 A.D. Saint Ambrose,bishop of Milan,collected these melodies and laid down rules for their use,while Saint Gregory 590 A.D. made a larger collection and increased the four scales of Ambrose to nine so that we have the Ambrosian Chant and the Gregorian Chant from which came the noble music of the Church.

About 875 A.D. Hucbald a monk of Flanders arranged vocal music in parts and invented a new system of notation on lines from which our present music got its form .About 1;000 A.D. Guido of Arezzo another Monk anticipated our Tonic-sol-fa system. At the same time Francis of Cologne made the first attempt to measure music by four standards of length and placed a time signature at the left end of the staff About 1250 A.D. the art of Counterpoint became popular particularly in the skilled hands of Adam de la Hale.In the Netherlands in the fifteenth and sixteenth centuries it reached its highest development.

Much of the music of the twelfth and thirteenth centuries originated in Paris and was carried allover Europe by the Troubadours and Minnisingers who also cultivated poetry and music.

About 1400 A.D. there was John Dunstable in England and Du Fay in Burgundy then appeared the great Flemish composer Josquin Depres who wrote much sacred and secular music, then Obrecht,chapel master at Utrecht,and "Mirabile dictu" the art of printing was perfected and gave a new impetus to the production and publication of music so that many names were added to the list of composers,among them were such as Willaert of Saint Marks,Verdelot,Arcadelt,and Orlando di lasso, then some truly great composers like Constanzo Festa,Zarlino,Merulo,Marenzio,and the greatest of all great composers before Bach,the genius Palestrina.

In Germany we find Isaak Walther,a friend of Luther,Gallus Stolzer, and Leo Hassler in 1600 A.D.

In England a bevy of musicians takes the field.Among them were Christopher Tye,John Merbeck,Thom,Tallis,Byrd,Edwards,Whythome,Younge,Morley,Blow and Ball and many others whose sparkling music laid the foundation for the days whenthe great Purcell should add his original genious to the list.

An Outline of Music 2

Now dawned the new day for musical instruments and we see the violin and the organ in much finer form so that the orchestra was gradually perfected and modern music found its place. Besides the large English group, there was in France Chambonieres and(Conperin)who composed dance music,and Cambert and Rameau who were skilled organists that paved the way for greater players like Frescobaldi,Karl, Froberger and Buxtehude the remarkable Danish organist,about 1650 A.D.

In Italy there were the members of the Amati family famous for their violins, Among their students was Antonio Stradivari or Stradivarius 1644-1737. whose skill in violin making is a household word, He was followed by Arcangelo Corelli who gave the world his famous sonatas and concertos for stringed instruments accompanied by harpsichord or organ. Then came the gifted group of the Corelli students including Somis,Locatelli,Veracini,Tartini,Vivaldi, who developed the technique of instrumentation as well as of musical construction.

In Germany there was Handel the great composer of operas and oratorios as well as leader of concert and choral groups,followed by the immortal Sebastian Bach who poured his marvelous genius into not only Germany but into every land his compositions are among the world's richest treasures. Bach was followed by his two great sons Karl Philipp and Johann Christian who refined the sonata,the opera and the symphony. Then came Haydn with his wonderful atring quartets,sonatas,and symphonies,and Mozart with his master symphonies,and Gluck the great composer of Orfeo. During this period the great Italian pianist Muzio Clementi developed and manufactured the pianoforte and wrote his "Gradus ad Parnassum",a series of studies in style and composition which are still in the course of every student of music. This opened the way for the great symphonists such as the immortal Beethovan 1770-1827 whose remarkable talent affected every department of musical expression. He is called the Shakespeare of music and became the inspiration of all the best musicians of our time. One writer says the foundation of his tonal palaces is dug deep in the past but their towers pierce the very skys. His 32 sonatas,many concertos and 9 symphonies are the greatest in musical art. Following him came Hummel,Ries and Karl Weber ~~the~~ who left the classic school for the romantic. Then appeared Franz Schubert and Louis Spohr ,experts on organ and violin and Felix Mendelssohn who wrote his famous and popular "Midsummer Night Dream",his Variations and Oratorios.

In France,at this time,we find Hector Berlioz,the greatest French composer, Father of the Programme,in musical entertainment. His music is agitated,dramatic and sometimes fantastic. His "Te Deum"is sublime,and his "Damnation of Faust"has won an ocean of praise. In Poland Frederic Chopin,the poet musician,from whose genius came a flood of marvelous music equal in many respects to the greatest German composers. He also wrote many studies which are used today and his harmonies were the most daring in his century,while his skill as a pianist has never been surpassed.Beside him was the refined Franz Liszt in Hungary whose great popularity as a pianist and whose remarkable symphonic poems have won him a place in the hall of fame.

In closing this all too brief summary of musicians who have passed on we must include the names of Rossini,Donizetti,Bellini and Verdi in Italy; Schumann, Brahms,Wagner,Strauss and Wolf in Germany; David,Thomas,Gounod,and Lalo in France; Bennett,Wallace,Barnby,Gilbert and Sullivan in England; Glinka,Rubinstein,Arensky and Tschaikowsky in Russia. The world's favorite pianist,Paderewski.

The truly great musicians still living need no comment.

W.G.C.

THE STORY OF PHILOSOPHY

Philosophy is the love of wisdom and the study of basic ideas as revealed in the process of constructive thinking. It is systemized human knowledge. As the various sciences have developed the scope of philosophy has been narrowed to the theory of things such as matter,energy,law,cause and effect,and the nature,extent and composition of the universe.

The history of philosophy may be conveniently divided into three periods: ancient,mediaeval and modern. Ancient philosophy was largely Greek so we will confine our brief story to that nationality; Mediaeval philosophy was characterized by scholarly disertation and became known as Scholasticism; Modern philosophy began with the Renaissance which was a rebirth of classical learning.

Greek philosophy began with the teachings of the famous Ionian Sages 600 B.C. Thales of Miletus who developed the philosophy of his day from a childish mythological explanation of the world to a scientific interpretation of the origin, laws, and nature of the universe. He was followed by Anaximander and Anaximenes also of Miletus who were in turn superceded by the greatest Ionian, Heraclitus who taught that fire was the primal element of all substance. Next came Pythagoras of Samos who moved to Italy and founded his great school at Crotona in 529 B.C. where he taught that nature is not so much matter as it is thought, and developed his theory on the relation of numbers and the evidence of proportion. Then came the Eleatic School under Xenophanes about 540 B.C. whose best representative was Parmenides who taught,the opposite of Heraclitus,that all is not change but that all that now exists remains forever and this was the first suggestion of the law of the indestibility of matter. Then arose the great Empedocles and Anaxagoras,the teacher of Pericles,who together accepted the immutability of matter but denied the singleness of substance which now opened the way to the first suggestion of the atomic theory of matter by Democritus. Between this epoc-making theory and the rise of the Athenian School there appeared ~~the~~ Protagoras and Gorgias under whose joint attack, couched in sophisticated skepticism,many of the false ideas which had crept into it, were cut away and thus prepared for the famous Athenian School under the more famous Socrates with his lesser and greater pupils. Socrates was the most unique figure in Athens about 444 B.C. and set up his famoue method of moral truth and life. His lasser followers were onesided and unwilling to seek the full development of his teaching regarding strict morality. Among them were such leaders as Antithenes founder of the Cynic School and indirectly founder of the Stoic School,and Aristippus of Cyrene in Africa who established the Cyrenaic School which taught that pleasure is the highest good. But the two most noted disciples were Plato and Aristotle who,although quite different from their great teacher,developed the theoretical side of his teaching,as the lesser followers had the practical side. From Plato we have rich contributions in logic,psychology,metaphysics and ethics,while from Aristotle,the keenest thinker of Greece,we have the most unique contributions of intellectusl attainment man had achieved before the Christian Era. After his death his works were severely attacked by another school of skeptics under Pyrrho, Xenocrates and Polemo who so modified Plato by the addition of Pythagogean ideas that their writings became so different that they were almost new theories. But they were followed by Carneades of Cyrene and Clitomachus of Carthage who fought the rigid dogmatism of the Stoics about 150 B.C. We come now to the end of the old era and note,in passing, the rise of the Eclectic School of philosophy under the great orator Cicero in Rome,and the Neo-Platonic School under Philo in Alexandria.

The Mediaeval Period of philosophy is called the Scholastic Period and Scholasticism was essentially a synthetic view of the universe embracing the world, man and God and their interrelations discoverable through experience and revelation. It was better than what had been before in that it was orderly,systematic,scientific and reverent and covered much more in its search for data than anything that preceeded it. The greatest leaders were Anslem,Thomas Aquinas,Albertus Magnus, Bonaventura and Duns Scotus.

Story of Philosophy 2

Besides Scholasticism which dealt primarily with speculation and theory there was Mysticism which was a conviction on the part of many that one didnot need to study all the maise of human thought to reach God, but might immediately come to Him in soul-attitude - contemplation. Scholasticism sought to apprehend and comprehend truth through investigation by reason. Mysticism sought the same result through the sympathies and emotions of the heart. The foremost leader in this school was Thomas A Kempis who wrote, "The Imitation of Christ".

From this much mixed period the process of human thinking passed through a more mixed confusion of tongues in the form of a transition which was the dawn of the great period of Modern Philosophy. During this formative transition which was necessary to free the minds of men from the intellectual thraldom of the age, there were several more or less successful efforts to throw off the yoke. About 1450 A.D. Nicholas of Cusa wrote his Four Dialogues on the mind, entitled, "Idiota". At the same time there was an attempt to revive the ancient authors under Ficinus who translated Plato and was the most celebrated member of the new Platonic Academy founded in Italy by Polethro the favorite philosopher of the Medicis. The next great name is that of Paracelsus a Swiss physician who was too fantastic in theory. Of those who took exception to this attempt at revival of the ancient philosophy no name is greater than that of Taurellus the German who was largely followed by later philosophers. In Italy the transition continued under the leadership of Bruno the monk. Passing by the political and agnostic writers of this generation we come to the Astronomical philosophers Copernicus, Kepler and Galileo who introduced mankind to the true motions of the world and the stars for the first time in the history of all time.

Modern Philosophy began with two famous names that will be long remembered, they were the great Sir Francis Bacon, father of modern science and natural philosophy, and the remarkable Frenchman Rene Descartes a Jesuit and master of mathematics in Paris, who after various travels and military experience settled in the Netherlands to write his philosophy. Bacon was the founder of empirical philosophy 1561 - 1626 and might be called amaster of all trades because he touched and glorified so many, yet it is said that he loved many things more than virtue. His survey of the sciences of his day showed what had already been done and indicated what still awaited the attention of scientific men. Descartes wrote his principles of philosophic research in an effort to recast all human knowledge according to the presupposition that all previous knowledge was simply a mass of guesses that must be carefully reexamined and properly evaluated; some to be verified and accepted, others to be utterly rejected. He also wrote his Philosophy of Nature, of Man and God; and was in all his work the pioneer of the new scientific method of research. Following the lines laid down by Descartes, but deviating greatly at certain points, we find the peculiar Occasionalists under Geulincx who taught that God is responsible for all motion and change even in the smallest activites of human life. This so-called Occasionalism formed the transition to the Pantheism of Spinoza of Amsterdam whose chief work was his "Ethica" in five parts which cover the nature and origin of God, of man, emotions and passions, mind and reason, and moral freedom. BUT HE WAS A PANTHEIST. Meantime Blaise Pascal wrote his powerful philosophy of Christianity. Descartes ideas were thus somewhat enlarged, changed and restated finally became a divided system until the great Englishman John Locke of Bristol in 1690 published his remarkable work "Onthe Human Understanding" in which he pointed out that our ideas are not prodused by God nor yet by ourselves but by sensations from outside ourselves. Locke also wrote clearly regarding the various other problems of mental, moral and political philosophy, thus solving some of the most difficult questions of the time.

We come now to the 18th. century and its brightest star, Sir Isaac Newton a profound philosopher of nature and a devout Christian whose scientific work we all have admired and praised. And now that our space is filling up and every one has heard of the writings of present-day philosophers we shall just list their names.

In England - Priestley, Butler, Berkeley, Hume, Reid, Darwin, Wallace, Spencer, Hobbes.
InFrance - Voltaire, Diderot, Rousseau, Bonnet, La Mettrie, DuBois-Reymond, Grimm.
In Germany - Leibnitz, Wolfe, Kant, Fichte, Hegel, Shopenhauer, Thomasius, Wolff.
In America - Emerson, Fiske, Ladd, James, Bowne, Benj. Franklin, John Dewey.

W.G.C.

THE STORY OF PHYSICS

Physics is the study of the universe with special reference to its nature, ts form,content,laws,and future. It is said that about 5,000 B.C. there was a well eveloped knowledge of physical science but it was not known by that name. Evidence f this has been preserved in the ruins of temples,bridges and roads built by the ncient Sumerians in the valleys of the Tigrus and Euphrates rivers and seen by many ravelers from other lands. Besides this beginning of Archaeology there was an attempt t Astronomy and Mathematics and some basic ideas were developed e.g. the discovery of the Saros,a period of 18years 11⅓days during which eclipses recur; the relation of the sides of a right triangle e.g. 3.4.5inches;the times of solar and lunar eclipses;the names of the constellations and their brightest stars;and the decimal system of notation. These skills and their practical knowledge were later brought into the Nile valley where they flourished among the Egyptians during and after 3,500 B.C. at the time when the great pyramid was built about 2900 B.C. The preparation and practice of medicine as well as surgery were popular.

The planned study of physical science and its laws began in Ionian Greece and spread into Greece proper and thence into Europe. Perhaps it is correct to say that the first true scientist was Thales of Miletus 624 to 564 B.C. who headed the first school.He was a statesman,engineer,philosopher,mathematician and astronomer. He believed that the Earth rested on water which he considered the basic element of the universe. He was followed by Anaximander a geometer,geographer,naturalist and astronomer who thought the earth was flat and at the centre of the universe around which the stars,attached to a great sphere,revolved. He said the sun and the earth were of equal size and suggested the idea of evolution and the ether, Then came one called Anaximenes also of Miletus, who thought that air was the basic element of the universe and that all matter has life. He was followed by the great Pythagoras of the island of Samos who was therefore called "The Samian Sage" and who gave the world the word PHILOSOPHER,later he moved to Croton in south Italy where he set up his famous school - a brotherhood of 600 companions,all vegetarians to whom he taught temperance, purity,morals and philosophy.He wore a white robe and a gold crown and never smiled. His ideas about the solar system were similar to many modern notions and he invented the curious fancy called "The Music of the Spheres" He lived until about 500 B.C. Next came Heraclitus of Ephesus who taught that fire was the fundamental element of the universe and all things are in a state of flux. Empedocles of Agrigentum was next and taught that cold,heat,dry,and wet were the basic elements in nature and that the earth was a mixture of all of them;he also suggested that light travels with finite speed. Then Zeno the mathematician,not the Stoic,and then Anaxagoras of Clazomenae who was followed by Democritus of Athens in 470-400 B.C. who said the universe was made of nothing more than atoms and space;that the atoms are indivisible and changeless and in constant motion and the universe is a machine on a predestined path. As the once popular school of Pythagoras declined a new one arose in Athens but the Persian war disrupted everything. After the war Athens became the capital and the surviving scientists were led by Hippocrates of the island of Chios,not Hippocrates of Cos, the"Father of Medicine",wrote a text on geometry which helped Euclid later. He was also famous for his Lunes of a triangle and the invention of the process of geometric reduction which consists in passing from one proposition to another. Then came the three wise men of Athens:Socrates,Plato, Aristotle, but they made almost no contribution to physical science. The next was Eudoxus of Cnidus an astronomer and mathematician who suggested that the universe was composed of 27 spheres with the earth in the centre. Following him there was Heraclides of Pontus who taught that the earth was fixed and thus prepared the way for Ptolemy and a backward trend. Menaechmus of deathless fame for his discovery of the Conic Sections. After Alexander the Great conquered Greece two new schools arose to comfort and ease the the sufferings of the people. The first was set up by Epicurus of Samos who insisted that pleasure should be the chief source of relief to the distressed people; the second by Zeno of Cyprus who went to Athens in 311 B.C. and started the Stoics for the same purpose. Then Euclid of Alexandria a mathematician wrote his "Elements of Geometry" and Diophantus invented Algebra which has remained much the same ever since. Aristarchus of Samos followed but used different methods in astronomy which were not accepted and the ancient world turned back to the naive teaching of Eudoxus.

Archimedes of Alexandria was next 287-212 B.C. He was famous for his work in engineering and for his determination of geometric formulae. Then came Eratosthenes of Alexandria 276-195 B.C. who measured the size of the earth from Syene and Alexandria as shadow bases during the Summer Solstice. He also found the obliquity of the ecliptic from the celestial equator. At the same time Apollonius also of Alexandria made a special study of the conic sections and suggested their names by which they are still known. Then appeared the Father of Scientific Astronomy,the great Hipparchus of Nicaea190-120 B.C. who built the astronomical observatory on the island of Rhodes. He found that Spica,the brightest star in Virgo,had changed its position by 2 degrees in 160 years and he listed 1,000 stars in their proper positions ;he also discovered the precession of the equinoxes and invented trigonometry and the solution of spherical triangles,and now we come to the reign of the Ptolemys in Egypt and note especially the name of Claudius who wrote the Almagest and changed the transparent spheres of Eudoxus into plane circles and epicycles. Science at Alexandria now began to decline and theological controversy took its place,and since neither the theologians of the priesthood nor the political leaders of the Roman government favored scientific research,and since Alaric,king of the Visigoths,and his hordes conquered Rome we must turn to the East for material to continue our story. In India we read of men like Arya Batha of Patna an algebraist who published his table of Sines and his Aryabatha,a series of rules and propositions written in verse,about 500 A.D. Next came Brahmagupta,another Hindu mathematician and astronomer who wrote much on mathematics and numeration,about 640 A.D. Much later there arose the great Bhaskara about 1114 A.D.wrote on astronomy and mathematics and was the first to explain the methods of addition,subtraction,multiplication,and division. similar to our present practice. Among the Arabians we find Haroun-al-Raschid who had the works of Aristotle,Hippocrates,and Galen translated into Arabic for his people. Then there was al Kindi of Basra in about 840 who was the greatest philosopher of the Arabs. He wrote on optics and the refraction of light. Next was Ibn-al-Haithan about 1,000 A.D.who studied mirrors and lenses and showe that things are not seen by light projected by ones eye but by light from the object entering the eye. Then Ibn -Yunas at the same time studied and developed trigonometry and became the foremost Arabic astronomer.

Now Mohammedan science wilted in the East but took on new life in Spain especially at Cordoba and Toledo . Under progressive caliphs Arabian knowledge spread in Europe and many classical books were translated into Arabic and Latin. In 1080 A.D. Anzachel of Cordoba anticipated Kepler regarding the elliptical shape of the planet's orbits around the sun, About 100 years later Robert Grosseteste while chancellor of Oxford and bishop of Lincoln performed many experiments with mirrors and became an expert in mathematics. In 1250 John Peckham wrote much on difficult optical problems. Then came Roger Bacon a Franciscan friar who wrote his Opus Majus but was imprisoned for his strange ideas and experiments but was recognized as the prophet of a new age - The Renaiseance.

The Renaiseance period is said to be the Birth of Modern Science. In it we find the list of names interested in science an ever increasing catalog,and we cannot give them all but will try to reacquaint you with some of the more important ones, thus-- NAME ------- BIRTH - NATION ------------ ACHIEVEMENT ---------------
Oresme,Bishop of Lisieux,- 1332 - Engl.theologian,astronomer,adviser to Charles V.
Leonardo da Vinci -------- 1452 - Italian artist and sculptor,wrote,"Method in Science".
Nicholaus Copernicus ------1473 - Polish astronomer,wrote,"Libris Revolutionum".
Paracelsus(Philipp Hohenheim1490- Swiss alchemist physician,produced ether.
Niccolo Fontana Tartaglia- 1504 - Italian mathematician,developed cubic equasions.
William Gilbert ---------- 1540 - English natural philosopher,wrote "De Magnete".
Tycho Brahe -------------- 1546 - Danish astronomer,the king built an observatory.
Giordano Bruno ----------- 1547 - Italian scientist and philosopher,burned at stake.
John Napier -------------- 1550 - Scotch mathematician,invented logarithms.
Henry Briggs ------------- 1561 - English mathematician,developed decimal logarithms.
Galileo Galilei ---------- 1564 - Italian physicist,made first astronomical telescope.
Johann Kepler ------------ 1571 - German astronomer, worked out laws of planet motion
Rene Descartes ----------- 1596 - French natural philosopher,scientist,wrote"Le Monde".

NAME	BIRTH	NATION ACHIEVEMENT
tto von Guericke	1602	German physicist,inventor of the air-pump.
iovanni Borelli	1608	Italian physician ,mathematician,prof.at Pisa.
obert Boyle	1627	English chemist and physicist,worked out"Boyle's Law".
hristian Huyghens	1629	Dutch physicist and astronomer,made several inventions.
obert Hooke	1635	English physicist who made many important inventions.
saac Newton	1642	English natural philosopher and physicist.
ottfried Leibnitz	1646	German philosopher and mathematician,scientist.
John Flamsteed	1646	English physicist,the first Astronomer Royal.
James Bernoulli	1654	German mathematician,Professor at Basel University.
George Stahl	1660	German physician and chemist,corrected many false ideas.
James Bradley	1693	English Astronomer Royal,explained the aberation of Light.
Benjamin Franklin	1706	American scientist,statesman and author.
Leonhard Euler	1707	Swiss mathematician,chief of Berlin Academy of Science.
Joseph Black	1728	Scotch chemist,evolved the famous theory of latent heat.
Charl Messier	1730	French astronomer,discovered 103 nebulous objects.
Henry Cavendish	1731	English philosopher and chemist,also a mathematician.
Joseph Priestley	1733	English clergyman and scientist,discovered oxygen.
James Watt	1736	English mechanical engineer,made several inventions.
J.L.Lagrange	1736	French mathematician,unusually brilliant.
C.A.Coulomb	1736	French physicist,mainly interested in electricity.
William Herschell	1738	German-english mathematician and astronomer.
A.L.Lavoisier	1743	French chemist,Father of Modern Chemistry,
Simon Laplace	1749	French astronomer and mathematician,Nebular Hypothesis.
Count Rumford	1753	American physicist mainly interested in Heat.
Joseph L. Proust	1755	French chemist,established law of chemical proportions.
John Dalton	1766	English chemist and natural philosopher.
Karl F.Gauss	1777	German mathematician,worked out planetary orbits.
Humphry Davy	1778	English natyral philosopher,invented miner's lamp.
Geo.S.Ohm	1781	German physicist electrician,discovered Ohm's Law.
Michael Faraday	1791	English chemist and physicist,many electric invents.
John Herschell	1792	English astronomer,son of William above.
Luigi Galvani	1793	Italian chemist,discovered Galvanism.
L.N.Carnot Sadi	1796	French physicist,mainly interested in Heat engines.
George B. Airy	1801	English Astronomer Royal,mathematician,physicist.
R.W.Bunsen	1811	German chemist,inventor of the Bunsen burner,
J.P.Joule	1818	English natural philosopher,defined unit of work,etc.
H.L.Helmholtz	1821	German physicist,suggested the contraction theory. of sun.
William Thomson(Kelvin)	1824	English mathematician and physicist,thermometer.
G.R.Kirchoff	1824	German physicist,invented the spectroscope.
George P. Bond	1826	American astronomer, discovered crape ring of Saturn.
J.Clerk-Maxwell	1831	English physicist,determined the nature of Sat's rings.
Alvin G. Clarke	1832	American optician,maker of large telescopic lenses.
Dimitri Mendeleef	1834	Russian chemist,published "Elements of Chemistry".
Simon Newcomb	1835	American astronomer,head of the Nautical Almanac.
J.Norm.Lockyer	1836	English physicist and astronomer at Royal College.
Henry Draper	1837	American physician and astronomer,New York Univ.
S.W.Burnham	1837	American astronomer,discovered 1200 unknown double stars.
T.R.Oppolzer	1841	Austrian astronomer,professor at Vienna University.
Camille Flammarion	1842	French astronomer,wrote several books on Astronomy.
T.C.Chamberlin	1843	American geologist,President University of Wisconsin.
Lewis Boss	1846	American astronomer,director of Dudley observatory.
E.C.Pickering	1846	American astronomer/professor at Mass.Inst.Tech.
A.A.Michelson	1852	American astrophysicist,head of Dept.of Phys.Chicago.
Percival Lowell	1853	American Martian astronomer at Flagstaff,Arizona.
Heinrich Hertz	1857	German physicist,professor at Polytechnic Institute.
Edward E. Barnard	1857	American astronomer,at Yerkes observatory,Chigago U.
J.R.E.Clausius	1857	German physicist, But another source gives 1822.
W.H.Pickering	1858	American astronomer, professor at Harvard University.

-------- NAME -------------BIRTH NATION ---------------ACHIEVEMENT ---------
Svante Arrhenius ------------- 1859 -- Sweedish physical chemist,electrolitic disociation.
George W.Ritchey ------------ 1864 - American optician and astronomer, made mirrors.
George Ellery Hale ----------- 1868 - American astrophysicist,in charge of Mt.Wilson.
Robert A.Millikan ------------ 1868 - American physicist,California Instute of Tech.
Charles G.Abbott ------------- 1872 - American astrophysicist,head of Smithsonian Inst.
F.R.Moulton ------------------ 1872 - American astronomer,proffesor at Chicago Univ.
W.S.Adams -------------------- 1876 - American astronomer,at Mount Wilson Obs.
J.H.Jeans -------------------- 1877 - English astronomer,and popular writer.
Henry H.Russell -------------- 1877 - American astronomer,and author.
Albert Einstein -------------- 1879 - German astrophysicist and mathematician.
Antoon Lorentz --------------- 1882 - Austrian astronomer and mathematician.
A.S.Eddington ---------------- 1882 - English astronomer and astrophysicist.
Harlow Shapley --------------- 1885 - American astronomer and mathematician.
P.W.Merrill ------------------ 1887 - American astrophysicist and astronomer.
Ewdin P. Hubble -------------- 1889 - American astrophysicist and astronomer.
Seth B. Nicholson ------------ 1891 - American astrophysicist and astronomer.
Otto Struve ------------------ 1897 - American astrophysicist and mathematician.

NOTE --- As I have said before,these names are but a few of the better known authorities when for thirteen years I studied at and graduated from four different colleges in Canada and the United States. They are from my voluminous notes of university lectures and assignments and from various self-chosen subjects,if you wish to pursue them further be sure and use a good modern encyclopaedia. W.G.C.

POEMS

XV

Presented Tray; Returns Favor

Years of service in many unrelated fields by the Rev. W. G. Colgrove has been recognized by the University of Western Ontario.

Silver Tray

In a special ceremony in the office of Dr. G. E. Hall, president of the university, Mr. Colgrove, who has retired from the faculty, was presented an engraved silver tray. The presentation was made in the presence of all departmental heads under whom Mr. Colgrove had served.

Mr. Colgrove, after receiving the gift, reversed the procedure and presented Dr. Hall and the heads of departments with a copy of his book of poems, "Spare Time Poems."

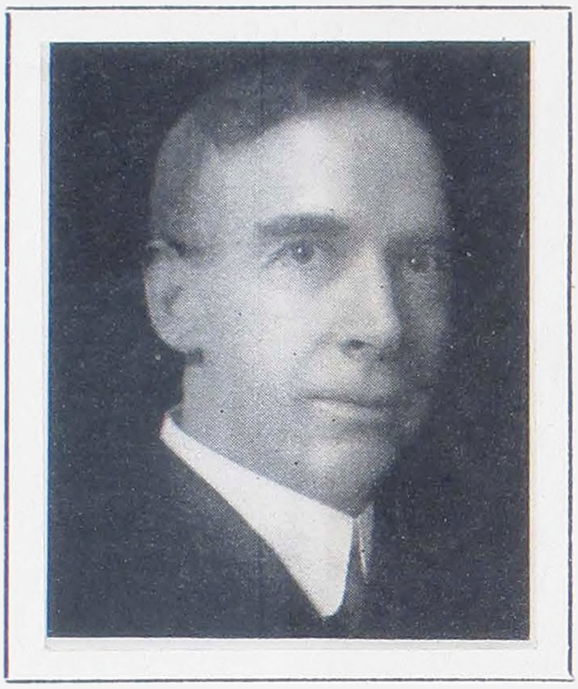
Many Rolls

Mr. Colgrove, during his years at the university served as assistant in the Department of geology, taxonomist in the Department of Botany and lecturer in the Department of Astronomy. Many of the laboratory instruments used in science departments at the university have been designed by Mr. Colgrove and much of the demonstration equipment used in the Department of Astronomy was of Mr. Colgrove's invention.

Mr. Colgrove, besides being an inventor-at-large has also received acclaim as an author of poetry, of scientific articles and religious-scientific literature.

June 15/21.

SPARE-TIME POEMS



BY

W. G. Colgrove, B. A., M. A., B. D., Medalist

2 Christie Street

LONDON - CANADA

ART

APPEAL TO ART

O Art, dear Art, what dread disease
Hath smitten thee and thy keen sense,
That thou shouldst be so far bereft
Of all thy classic excellence,
In line and curve and perfect form?

What plague hath robbed thee of thy grace,
And substituted crookedness
For thy fine curves and flowing drapes,
Which were the points of early stress
That filled our spacious halls of fame?

O Art, we could weep bitter tears
For thee, because of such alarms,
That so-called modern devotees
Have prostituted all thy charms,
And put abortions in their place.

Proportion with its principles
Is almost wholly left alone;
True atmosphere is seldom seen,
And soon perspective will be gone,
So noblest art may disappear.

O Art of yesterday return,
Come back to earth once more we pray;
Let genius flourish in the land,
And seek again the ancient way
Of beauty, quality and truth.

Let not the work of giant minds
Be cast into destruction's flame.
While dwarfs with gushing self-esteem
Bask in the glow of cheap acclaim,
Voiced by the parrots of the school.

O Art, come soon, ere these usurp
Thy place and crown, and teach our youth
Their foolish, half-baked fallacies,
And worse than all, their work uncouth,
Which looks absurd and not abstract.

O Judges, what has stymied you,
Have you forgot fair Beauty's plan,
Fine drawings and true color schemes?
So you esteem a mess of lines
With slobbered tints as better than

SCULPTURED SNOW

There stands the man of snow
  All gleaming in the sun;
Too bad he'll never know
  He made us so much fun.

His body is immense
  And shapeless as can be;
His head has little sense,
  His eyes, they cannot see.

His hands stick out so far
  One has to watch his step;
He has no skill to spar,
  And no amount of pep.

He never says a word,
  He never even nods;
You say, how do, my lord,
  He's silent as the gods.

Some day Jack Frost will tire
  Of such an empty show,
And let the solar fire
  Change him to H2O.

VICTORIA'S STATUE

Of all the cities in the land,
This is the one where it should rest
Because we are art loving folks,
And yet possess none of the best.

Go up and down our thoroughfares,
Was e'er a city quite so bare
Of inspiration from great art?
One cannot find it anywhere.

Stop in our parks, scan east or west,
There's but a single monument
That holds attention for one hour,
But it reminds of manhood spent.

Where are the sculptors of our time?
Where are the statues of our great?
Have we none worthy of a bust?
No statesman and no potentate?

There is one spot to suit her grace,
That is, of course, Victoria Park,
Surrounded by some flower beds
And lighted when the day grows dark.

Ho, everyone, let it be known
You'd like to see her over there,
And tell the city fathers that
You'll gladly help because you care.

So let's no longer silence keep,
But urge to have the statue bought,
Don't wait until it is too late,
To buy a treasure such as that.

Some of us thought it might be bought.

ASTRONOMY

THE MORNING STAR

O daughter of refulgent Jove,
And wife of Vulcan down below
In Etna's heart, where fires glow,
Thou ne'er didst lose thy magic love.

I fain would lilt a song to thee,
Sweet goddess of the flower world;
May nectar in the blossoms curled
Reward the hastening honey bee.

At morn I scan the Orient sky,
And find thee playing with the clouds,
At hide and seek, or from their shrouds
Espying me so thrilled and shy.

Please show thy lovely form to me,
And let thy beauty still my soul;
Thou brightest starlet of the bowl
To all thy wonders give the key.

Don't say me nay, dear Lucifer,
Supernal glory is thy gown,
And thy fair chastity the crown
That makes mere man thy worshipper.

So rise and range across the dome,
Before old Sol with flaming steeds
Ascends to furnish human needs,
And hastes thee to thy western home.

O Phosphorus stay with me one hour,
Dispense thy potency divine,
By some strange alchemy refine
To me the secret of thy power.

This was the planet Venus.

A NOVA

I wonder what a nova is,
And how and why so suddenly
It bursts all nature's barriers
And with a cyclopean eye,
And something like atomic power
Shoots light throughout the universe;
Is it the ending of a stage,
Or does the cycle start again?

They say it is a star renewed,
Not new by any means my friend,
That it was there just where it stood
For untold ages, end on end;
But we could not behold it till
It reached the time for this display,
And many others no doubt will
As other eons pass away.

Its light and energy had grown
To far surpass the sun's great power,
And, had it planets of its own,
They'd all been cinders in that hour;
But doubtless stars are planet free
Until they reach that proper stage,
And thence a circling family
Perhaps begins to count its age.

'Tis thought that the first Xmastide
Was ushered in that distant night
By such a star at its rebirth,
Or by great planets in the sky;
The HOW of things has little worth
Compared to well established facts;
The presence of the Son of God
Is here to win the argument.

WHITHER BOUND?

The question mark has always stood
For anything beyond our ken,
It may be bad, it may be good,
But still we seek, as we did when
Long years ago we pondered well
The arching sky and its great height,
Or probed the depths in diving bell,
Or scanned the life that's out of sight.
    Since then we've seen the world rotate
    By nature's gyroscopic power,
    'Tis spinning at a dizzy rate,
    They say, a thousand miles an hour;
    This does not take us far from home,
    Because we stay upon the ball,
    And yet, much farther we all roam
    At greater speed along with Sol.
For now we know he's flying fast
At forty thousand miles an hour,
While Vega's stars go streaking past
Like spectres with atomic power;
And farther through the starry maze
We leave behind the double suns,
And flash into the depths of space
Like rockets shot from cosmic guns.
    Meanwhile we're speeding round the sun,
    Each hour some eighty thousand miles,
    In non-stop flight we make the run
    And check our fluctuating dials:
    We wonder oft how many times
    The earth has made its spiral path,
    What change has come to her fair climes,
    And what shall be the aftermath.
But, more than that we're carried in
A giant arm of Milky Way,
And must submit to speeds akin
To fourteen million miles a day;
But even though the speed is great
Around the central stellar core,
It takes to make it once rotate
Two hundred million years and more.
    As round the galaxy we ride,
    'Tis said the universe expands;
    And yet it cannot be denied,
    Because we do not understand;
    So where's the end or edge or top?
    Is Einstein right, or must we wait?
    Let's keep the faith and never stop
    Until we enter heaven's gate.

Where do we go from here?

THREE EVENING PLANETS 1949

In ancient times, some writers say
Folks called the twilight planets stars,
And some still do the same today
No matter how the truth it mars.

We see these planets in the sky,
And wonder at their brilliant lights,
And ask their names with pensive sigh,
Oft on these starlit autumn nights.

We're told that Jove's the highest one,
Great Jupiter of giant girth,
Whose bulk, one thousandth of the sun,
Is thirteen hundred times the Earth.

'Tis distant from us out in space
Four hundred eighty million miles,
But we can see him face to face
And watch his satellites defile.

The temperature out there is cold,
Two hundred down beneath zero;
The winds are raging, so we're told,
Three hundred miles an hour or so.

Its day is not ten hours' long;
Its year a dozen such as ours,
So that within its year there throng
Ten thousand hurried days and hours.

* * * * * *

The next is Venus, loved by all,
And still the cause of many smiles,
But not so large as Tellus' ball,
Away some sixty million miles.

She's tropical and humid too,
And her famed beauty's but a cloud
That hides her surface from our view,
Where probing Sol can't pierce the shroud.

OVER

And farther down amid the haze,
Elusive Mercury resists
Our inquisition's spying ways,
But may be seen if one persists.

This midget planet, so they say,
Is so blamed hot the thermal dials
Of a space-ship would melt away,
'Tis six and thirty million miles.

WHY STARS SHINE

Twinkle, twinkle giant star,
What a wonder now you are,
Since we've learned to calculate
And glean something of your state.
We are all a-jitter here
Wondering what you're doing there.

We employ the telescope,
Swing it round with patient hope,
Set its eye before your face
And observe you out in space;
Shine, O shine refulgent star,
We don't wonder what you are.

You are but a globe of gas
And through many stages pass,
Once you were a greenish youth
Vibrant, but to tell the truth,
You will some day turn the page
And advance to ripe old age.

Now we know why you still shine,
'Tis because you're balanced fine,
And by stellar chemistry
Urged by constant industry,
You combine the gasses right
To maintain your size and light.

ASTROLOGY

I've read the magazines and books,
And pondered its pretences o'er
I've ribbed these pseudo-science crooks
And found their falacies galore.

I've tried a score of horoscopes
On folks of high and low estate,
And found no answer for their hopes
But mocking emptiness and fate.

I don't complain if it's for play
And that seems all it has to share,
But when they ask for you to pay
I hope you'll say you've none to spare.

Because it's just a waste of time,
A waste of trust and money too;
Because its ignorance sublime ,
Makes nearly all its claims untrue.

Don't be deceived by such a ruse,
They have no contact with the stars,
Yet they your confidence abuse
By mouthing Jupiter and Mars.

Theirs is a racket like the rest,
Which to appear as higher class
Supports a publisher as guest,
And poses with its shameless brass.

THE DRESDEN METEORITE

Flashing like a blazing rocket,
Lighting all the countryside;
From the eastward it descended
Like a football glorified.

Sparkling as it fled to westward,
Thundering as it passed so near,
Gleaming brighter, ever brighter,
Bursting in the atmosphere.

We were standing on the campus
Wondering where it would alight,
Running, watching smoke and fire
Till it vanished from our sight.

Then we followed in the morning,
Found the place to which it flew,
Paid the price they wanted for it,
Brought it back to Western U.

MOUNT PALOMAR

The new look today is a look far away,
Far away from the haunts of our renegade race,
Very far from the strife of this wobbling world
To the unmeasured reaches of infinite space.

Tell me why is the quest made with such eager zest?
Are there crowns for the winners of this marathon?
If they bring back a picture of yonder abyss,
There'll be fortune and fame when the task is well done.

On a mount lifted high with its head toward the sky,
Looms the keenest inquisitor science has found,
Where the sun and the stars wait for us to revolve
On our annual circuit through distance profound.

In that Palomar giant with sinews of steel,
With its eyes that are fashioned from fireproof glass,
They will see through the heavens a billion light years,
By the glint of great mirrors surrounded with brass.

Will they halt when they're told of the spaces so cold,
Or have fear for their safety beyond the earth's air?
Nay, they will lift anchors like sailors of yore,
Like those of the Argo they will fearlessly dare.

Though this journey's assayed, it will never be made,
Since science has drafted and fashioned an eye,
That can see what transpired long ages ago,
Far away in the measureless depths of the sky.

Many thanks to the men with unusual ken,
To whose minds the Creator has secrets unsealed.
Of the eons and objects too vast for our sense,
Which show there His wisdom in wonder revealed.

See the 200 inch telescope - Page

THE COMET WHIPPLE 1947

Good morning! Have you seen the comet yet,
Or were your eyes co-centred on the ground?
Did worries bow your head and slow your feet,
So you did miss the cosmic glory gowned
In pearly evening haze?

Good day my friend, you surely did not fail,
To see the glowing aviant of space,
With its bright head and filmy streaming tail,
And its high speed in a celestial race
This side of Capricorn.

Good eve to you, and may I thus inquire
If on your rounds you've seen the comet, sir,
With its fair retinue of silver fire?
No, I've not seen it, but it caused a stir
Around the anxious world.

Whence came this spatial visitor so far?
Pray tell its nature and its grave portent;
Does it bring peace or herald aught of war
Upon this earth, on its strange mission bent,
Across the vault of heaven?

Where will it go from here, to east or west?
Or will it plunge and disappear, or rise
To greater heights, where we may see it best,
And hale it as an astronomic prize,
Beyond our fondest hope?

Let's keep keen watch like sentries on a hill
And wait in patience for the clouds to go:
Then with all haste scan yon horizon till
We catch a glimpse of nature's flag aglow,
Surpassing all the stars.

I photographed it with the Schmidt camera.

THERE IS NO SKY

There is no sky, the thing that I behold,
The thing that baffles me and has no weight,
No substance I can conjure with;
So subtle, so transparent, it abides
Within its strange estate.

How odd to be and not to be, said I.
And went my way into a score of domes.
But found astronomers as vague,
And not so skilled to hide revealing facts,
In their much studied tomes.

So that which we've called sky a thousand years,
Is naught but endless areas of space;
And yonder orbs that seem to stud
The spanless, broad, immeasurable void,
Have there no resting place.

And what about the vaulted arches there?
They never were, they do not hold the stars;
Nay, heaven's lights that flashed across
The primordial gulf and far away,
Ne'er met with any bars.

Then what is space, how made and how maintained?
Go ask the alchemist, the polyglot,
Consort with him who scans beyond
The vast beyond, to that which lies beyond
The range of human thought.

There is no sky, no bounds, no limits there;
Since that is so, what can the wonder mean?
And then I saw within my soul
That some things are observed with mortal eyes,
And some by insight seen.

DIANA'S RETURN

I've read in books, said Mother Earth,
  My daughter's coming home;
But when and how are Greek to me,
For though I read I cannot see
How men can tell her perigee,
  Say naught of when she'll come.

Astronomers are busy folks,
  Forever watching us;
Collaborating nights and days
About this old world and her ways,
About Diana's golden phase;
  Enough to make us cuss.

How do they know, how can they tell
  Such things may come to pass?
Great calculations they prepare,
With telescopes they watch her there
And measure by a spider's hair;
  There's no escape, alas.

But if she's coming as they say,
  Within a billion years;
I wonder if she'll stop and fret
About the limit Roche has set,
Or will she crash in fervent heat,
  That solid frame of hers.

'Tis fifty million years or more
  She's been away, you see,
Torn by a solar tidal wave,
Snatched from the ocean's mighty cave,
And held for ages like a slave
  'Twixt yonder sun and me.

And when she comes, I'll take her to
  That self-same spot again—
There she may sit upon my knee,
'Tween Panama and China Sea,
Where sunsets reach eternity
  That haunts the souls of men.

Will the Moon come back?

Though caught by stealthy thieves of space,
  She ne'er forgot her home;
But ever turned this way and smiled,
Just like a good obedient child,
And on my shores the tides uppiled,
  Though still compelled to roam.

The years have gone, the journey's done,
  Diana's home at last;
Through many a thousand leagues she hied,
With many a javelin in her side,
Flung by the fiery Sol who cried,
  I'll follow just as fast.

But what, my child, are all these marks?
  These blotches, pocks and spires?
Ah, Mother dear, I went alone
Through storms of flame and flying stone,
With fulminations of my own,
  Against those cosmic fires.

Alas, alas, I feel so strange
  Since you came back to me;
When in my arms I clasp your weight,
I feel I surely can't rotate
On tiptoe as I did of late.
  What must the reason be?

The answer is not hard to guess,
  For when the Moon sits down
There'll be a shock to Mother Earth
Like in the hour of Phoebe's birth,
And all around her giant girth
  A trembling to her crown.

Old Mother Earth with awful groan
  Will know her course is run;
She'll roll and wabble without aim
As solar forces grip her frame,
Only at last to yield in shame
  A captive of the sun.

The Moon will swell the Sea of Peace,
  But peace will then be gone;
Five thousand fathoms deep she'll sink,
And all the creatures on Earth's brink
Of Noah's ~~b~~lood will quickly think,
  And seek a safety zone.
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But though she sinks so far below,
  She's high above the foam;
Above the waves, above the crowds,
Beyond the air our planet shrouds,
Two thousand miles above the clouds
  She rears her sunkissed dome.

And so the continents will change,
  The shorelines be renewed;
While round the Moon on every hand
Three thousand miles of water stand,
And make the widening seascape grand
  From every angle viewed.

For many a mile her swelling bilge
  Will overhang the sea;
Full many a score of miles away
Her darksome shadow hold its sway
And make a night within the day,
  O'er limpid lake and lea.

And then the eyes of all the world
  Will focus on the sight;
The scientists all wide awake
Will go to see this fact or fake
And many a picture draw and take
  To ponder through the night.

With speedy craft they'll fill the sea,
  The ships with eager men;
But as they reach that arid strand,
They'll find no shore on which to land,
No harbour fit for ships to stand,
  So they'll return again.

The airmen then like gulls will seek
  A place to disembark,
But ever and anon they'll fail,
Their efforts seem of no avail,
They never, never can assail
  That rugged ceiling dark.

Ah, what's the use, all say at last,
  Attempting such a chore?
Let's go back home to plod and grope,
To work, to ponder and to hope,
And meanwhile use the telescope
  As we have done before.

BOTANY

EARLY WILD FLOWERS I.

(Harbinger of Spring)

Well hidden away till a warm Spring day,
  Neath dark brown leaves in a forest glade,
There the glassy stems with the finest gems
  Of the floral world their venture made;
From apparent death came their life and breath,
  The dainty flower and the fretwork leaf
Emerged through the woof of its wind-built roof,
  The first to rise from the winter's grief.

(Common Hepatica)

When the March winds tear in the tree-tops bare,
  Or wildly charge down a winding hill,
When they howl and sweep through the forest deep,
  And shriek 'round the wreck of a haunted mill;
With their petals pink they'will slyly wink,
  As their smiling floral stars once more,
With their three-lobe leaves from their furry sleeves
  Bespangle the sunlit woodland floor.

(Yellow Adder's Tongue)

When the April showers and the sun-bright hours
  Have warmed and watered the mossy dells,
One may wander wide o'er the country side,
  To find the haunts of these sylvan bells;
In a woodlot fair with its scented air,
  One may see a thousand trumps unfold,
With their blades so green in a mottled sheen
  And their shining perianth of gold.

(Common Blue Violet)

As the Springtime heat makes the cold retreat,
  And the sun begins to hotter burn,
On the grass so brown is a vernal crown,
  And early birds to the woods return;
Then a gentle flower in its sheltered bower
  Nods its azure head with easy grace,
While the breezes play with it through the day,
  And at sunset seek their resting place.

EARLY WILD FLOWERS II.

(Spring Beauty)
Where the warming breeze greets the budding trees,
  And the dead leaves dance with the fairy throng;
When the sun half high in the cloud-swept sky
  Makes a pattern rare with the shadows long;
If you look around you will see the ground
  Is decked with the florets gay and bright,
Of that dainty thing called the Pride of Spring,
  In its dress of green and pink and white.

(Wind-Flower)
Down a shady trail where the quiet quail
  Seek a dark sequestered nesting place,
You may find a spot in a shady plot,
  Where the fern fronds sway in gentle grace;
On the ground nearby you may soon espy
  Some wind-blown blossoms snowy white,
With a five-lobed leaf and its stay so brief,
  That it makes one think of time in flight.

(The Trillium)
In the woodland deep where the rabbits sleep,
  And the groundhogs hide the winter through;
Where the redbirds call in the spruces tall,
  And the black squirrels play as kittens do;
You'll find Wake Robin with his trine head bobbin'
  In official cap of white or red,
He is often seen painted pink and green,
  But sometimes grows all green instead.

(Marsh Marigold)
From high on a bank where the trees are lank,
  And the crows on top hold confab long,
One can see a pool with the fish in school,
  While a tree-toad trills to the cricket song:
Near by is a swamp where the bullfrogs romp,
  At its very edge are piles of gold,
Below many more gild the winding shore,
  And it makes one dream of wealth untold.

EARLY WILD FLOWERS III.

(Blood-root)

In a clearance bare where the sunbeams glare,
And its shining shafts work their alchemy;
Where the blackcaps climb in their stately prime,
And the grapevines clothe the Dogwood tree;
You may see a score, doubtless many more,
With their great green leaves where'er they stand,
And the big white bloom fit for any room,
And its reddish sap that stains the hand.

(Pepper-root)

On a sun-kissed knoll near a chipmunk's hole,
Where foxes prowl in the twilight dim,
And the ivy clings to the other things,
Like a hungry leech to a bather's limb;
In the dark subsoil where the rodents toil,
Are the crooked roots so pepper hot,
That a single bite proves the name is right,
And its ivory bells make a beauty spot.

(Blue Wood Phlox)

Round an old tree trunk that is partly sunk
In the mossy mold where it lies dead;
Where the antlered deer browses without fear,
And the doe reclines on a leafy bed;
Twixt the sun and shade in the sylvan glade,
One may chance upon a dainty hue,
As it sways and nods to the woodland gods,
With its salver shape of pale sky-blue.

(Garlic Mustard)

In the lowlands where there are rushes rare,
And the pastures grow so thick and rank;
Where the Great Ragweed rears its season's seed,
And the muskrats dig beneath the bank;
On a river side or a meadow wide
Stands the mustard capped in snowy white,
While its leaves so green in a polished sheen
Reflect the rays of the warm sunlight.

EARLY WILD FLOWERS IV.

(Dutchman's Breeches and Squirrel Corn)

When our May Day comes and the wild bee hums
Through the woods and fields and leafy bowers,
In the sun-bright spots of the forest lots,
One may chance upon these waxen flowers;
They are dressed in style for a little while,
And aloft display their banners white,
We see at a glance they are Dutchman's pants
Or Squirrel Corn packed in the earth so tight.

(Canada Mayflower)

Almost any day in the month of May,
When Sol is warm and the air is light,
One may venture far through the thicket bar
~~Stands the mustard capped in snowy white~~,
The scent in the trees is used by the bees
In their nectar search of the flowers there,
As they quickly sip from the ivory lip
Of this three-leaf lily now so fair.

(Shepherd's Purse)

In the yard close by one may soon espy
These common weeds witih heart-shaped pods,
Rising sheer in grace from a radical base,
And rooted tight to the sleeping clods;
The purses so green in score may be seen
Neath blossoms white on stems erect;
The roots burrow deep the moisture to seep,
And sagittate leaves grow up unchecked.

(Wild Geranium)

When swallows return with the crosier fern,
And the catbird cries in the sumach bush;
When the wren arrives and the kingfisher dives,
And we hear the song of the woodland thrush,
One may find on a hill this large~~r~~ Cranesbill,
With its hairy stem but one foot high,
And its flowers pink make one almost think
They were dropped from the purplish evening sky.

✱ On a snowy carpet gleaming white.

THE NIGHT BLOOMING PRIMROSE

Have you seen the nightly primrose blow
Right 'fore your eyes at half-past eight?
Have you watched its flowers ope and glow
On calm night air at rapid rate?

Have you seen the calyx sepals flick,
Its saffron petals fly apart?
While you stood amazed at nature's trick,
And marvelled at its occult art.

If you've failed in this, you better find
A rendezvous, where in the dark
They glow like fairy lamps enshrined
In sylvan shade, a shining mark.

Then follow me to my garden fair,
And watch this gem of midnight bloom,
While it breaks its golden chalice rare,
Like sprite emerging from the gloom.

You will say it's wonderful and grand,
And shout as many flowers blow;
You will wait to see the last expand
In regnant beauty, ere you go.

See pictures on page

THE CHRISTMAS ROSE

In my back yard there grows and grows
What experts call the Christmas Rose;

All summer long it spreads its leaves
And through the days a pattern weaves;

It splits them deep down to the hem
And then unites them at the stem.

Then in the Fall it starts to sprout
As though new life had broken out;

And, caring naught for frost or snow,
Begins with beauty to o'erflow;

And spite of wind or sleet or rain
From blooming it does not refrain.

At Christmas time 'tis at its best
And seems to never take a rest;

So through the winter time it blows
Right there amid the swirling snows;

And frozen tight with stems erect
It rears its blossoms quite unchecked.

Now this is something seldom seen,
A plant whose leaves are ever green;

Whose flowers rare of white and gold
With purple petals too unfold;

Like groups of stars they brightly shine,
Of every Christmas-tide the sign.

They grow in my garden.

THE WEED

I'm but a weed, yet recognized all round the world today
As one who has, within itself, the magic power to sway
The government to favor it because of rising wealth.
Regardless of the harm it does to morals and to health.
That makes me so darn popular, that I can blow at will,
My poisoned smoke into the face of any Jack or Jill,
For I don't care for manners, nor for customs good or ill.

It is not strange that I'm entrenched so solidly just now,
Within the thought and habit of so many dupes somehow;
They like me so, they'd rather die, by my lethal decree
Than give me up and be content to conquer and be free.
Their values are all based upon whatever they desire,
It matters not how deep it drags someone into the mire,
Nor yet how much good currency they fling into the fire.

It sure is nice that multitudes stay by me all the years,
So I can fill my money chest by sale of lost careers,
For when youth takes my furfural, my acrolin and oil,
Some care no more for high acclaim, nor even honest toil.
I make their breath obnoxious, their teeth become as jet,
My habit-forming tendency will make them addicts yet;
What matters it since I am out much golden gain to get?

Who has the right, I'd like to ask, to find a fault with me?
I give large gifts to every cause with generosity;
Why blame me for the evils, that from this habit rise?
I do not force on anyone my product in disguise;
But I am bound to do my best to make my virtues known,
It is not love that moves me so, that sentiment's outgrown;
So take or leave it as you wish, but let my faults alone.

Now braggart bold, I know you are a very favored weed,
But you are full of poison too, no rules of life you heed;
You do not care that nicotine destroys a person's health,
And breaks the power of his will by undiscovered stealth;
You give us nil for all we spend but poison gas to puff,
You lie about your virtues and, as if that's not enough,
You kill us by degrees, you rat, with your inhuman stuff.

From booklet, "Tom, Dick and Harry," Chap. XX.

THE WITCH BROOM

Some years ago I wandered wide,
In search across the countryside,
For specimens of interest to
The teacher of our little zoo,
Who taught us many useful facts
Of nature's secret ways and acts.

One day as I was driving o'er
A hillock, near the western shore
Of ancient lake, I saw a nest
High in a tree, and did my best
To climb and take the novel prize,
No matter what its shape or size.

But soon I saw 'twas far too great
For me alone to amputate,
And then it clearly proved to be
No nest, but some strange malady,
Developed by a parasite
That now was hidden out of sight.

A stunted growth so flat and wide
It spread four feet from side to side,
And two feet thick, with underneath
A mat of branchlets in a wreath,
All clustered like a great bouquet
For someone's sylvan wedding day.

It seems that by unlucky blow
An interloper, Mistletoe,
Had lodged a spore upon a limb,
And struck its roots with eager vim
Deep down within the pine tree's bark,
And drank its life-blood in the dark.

Thus it cut off the constant flow
Of sustenance from down below,
So that the branch soon drooped and died,
And fell to earth all brown and dried:
While the usurper grew apace
And more than filled the other's place.

'Twas soon removed and taken to
The museum at Western U.,
Where now the students may behold
A Witch Broom, oft in story told;
And anyone who cares may see
The strangler of the Scotch Pine tree.

I found it on the University grounds.

A SOLAR SYMPHONY

The other morn I stepped outside my door,
To see what seemed to be a fallen star:
Or someone's diamond dropt the night before;
But in a trice the glory disappeared
Because a little cloud eclipsed the sun,
And left the dew-drop dull.
I ventured closer, took the crystal sphere,
And placed it neatly in my microscope,
To see how it was made so limpid clear;
And gaze in wonder at its viscous wall,
Then deep beneath its fine transparency
I saw the blade of grass.
The glistening drop soon vanished from my view,
Borne on the wings of earth's warm atmosphere;
For Sol, in spite of cloud, had caught the dew
And wafted it to empyrean heights
To add its spectral lustre to his crown,
While I sat there amazed.
And now the vernal blade began to glow
With sunlight from the mirror underneath,
Which penetrated every cell, and lo
I saw the shape of things unseen before
More wonderful by far than pearly dew
Or rarest diamond.
I was intrigued, for there before my eyes,
Lay structures marvelous and passing strong,
All built of tubes and braces, midget size,
Wherein the magic chlorophyll employs
The alchemy of special solar rays
In photosynthesis.
Upon the upper surface one could see
Long graceful, curving veins suppressed in green,
While on the under side they rose to be
So parallel they looked like railway tracks,
Laid side by side until at length they merged
Together in a point.
From there down to the clasping stem I found
The midrib armed with many spiny hairs,
And on each side, a quite uncommon kind
Of check-valves, called stomata, little mouths,
Whose function is to balance the amount
Of transpiration's flow.
A drop of dew, the mirror of a star;
A blade of grass, an intricate machine,
That manufactures much of mammals fare.
Who reck naught of the beauty they devour,
Yet, in their turn, produce rich proteids
For us who need them most. Sd.

THE LADY'S SLIPPER

We strolled along a sleeping brook,
Down where we met the woodland dark,
And, passing through a sylvan arch,
We saw the birch's shining bark.

And just beyond that shady nook
There stood an Arbor-vitae tall,
'Twas studded thick on every side
With giant Cat-tails like a wall.

We ventured farther on our quest,
For we sought Cypripedias
Which are the shoes that Venus wears
When she goes for Asclepias.

But they seemed to escape our sight
And hid in some sequestered spot;
Yet perseverence was repaid
When we espied a gorgeous lot.

And there they glowed, a galaxy
Of stately ladies for a ball,
With hats of white and pink and green
And bands of sunlight over all.

They call this Cypripedium
Reginae of a royal sort,
Because they think it good enough
To grace a queen in any court.

We plucked a dozen beauties there
And bore them homeward with some pride,
For that same evening we would go
And place them at a patient's side.

From a cedar swamp.

A ROVING BOTANIST

One day in the heart of the Summer
I stood on the broad ocean shore,
And saw the green waters all frothy
On the crest of a jostling bore.
It crowded up into the narrows
With many a tumble and twist,
Like the fabulous flood of Niagara
One sees from the Maid of the Mist.

The rocks all around me were girdled
With garlands of blossoms entwined,
Resembling the glassy blown flowers
In Harvard's museum enshrined,
A marvel they are without boasting,
For the work of the blowers so rare
Created a wondrous collection
That cannot be equaled elsewhere.

I saw the fine fingers that fashioned
A rose in its beauty of form,
Its color surprisingly life-like
So close to the natural norm.
I thought of the heaven's Creator
And said to my wondering wife,
Too bad they are wholly unable
To give to their miracles life.

Then out to the great Arboretum
With a wealth of exotic trees,
And down to the fine Boston Gardens
Where swan-boats were sailing at ease.
But tired we were of flat country,
So hied for a change to the hills
Where a face at the top of a mountain
Looks down on the wild daffodils.

Then across to the Habitat highlands,
And up to our old Montreal,
Nestled close to a volcanic crater
With a jagged-face vertical wall.
High up the precipitous mountain
Half hid in a natural coin,
Smiled a hyacinth sweet as an orchid
That bade me ascend to purloin.

One of my happy holidays - W.G.C. OVER

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But danger was greater than courage,
Yet bold I the precipice scanned,
And soon the botanical treasure
Was almost in reach of my hand;
I leaned to the left and obtained it,
My foothold then crumbled away,
I reeled in dismay at the prospect
Of ending my life on that day.

In falling I grasped a small sapling
Whose root was held tight in the rock:
My sweat cooled so fast I was chilly
But soon I revived from the shock.
Once more on the ground I thanked heaven,
Then fastened my prize in the press,
And packed for a sail up St. Lawrence
Through isles by the thousand I guess.

We skirted the banks of the river,
Observing each flower aflame,
Then landed and drove to Lake Scugog
And later to Simcoe by name.
Saw much of the granitic roundheads,
And yearned for the mountains again,
So we headed for Banff and its beauty
Where we could meet danger like men.

Before us stood proud Sulphur Mountain,
With snow on its summit and peak;
Undaunted we climbed the smooth foothills
Where flowers were pink as her cheek.
Then up through the brush and the tangle
Where snow was eleven feet deep,
We at last re-emerged into sunlight
And looked at our perilous creep.

We now saw the peak looming higher,
Aglow with red lichens suppressed,
And that was the prize I was after
A gem for my specimen chest.
I struck it smart blows with the hammer
And tucked it away in my sack,
Then viewed the horizon and valleys
And soon we were on our way back.

To the right the underbrush crackled;
We thought it a goat or a bear,
Then braced for an uneven battle
But found it was only a scare.

For out from the thicket a boulder
Released by the hot July sun,
Came hurtling harmlessly by us,
Our dangerous day's work was done.

Then over the trails to the chalet,
And up through the woods to Louise
Where we gathered the tiniest Dogwood
And listed the names of the trees.
We descended again to the highway
And motored two days to the West,
Through mountains too many to mention
And scenery much better than best.

Ere long we had passed through the city
And down to the curved beach's arc.
Then around the circuitous driveways
That lead to the famed Stanley Park.
Here indeed is a heaven of flowers,
Rhododendrons and roses amassed,
Surprising, amazing and glorious
And leaving all others surpassed.

We looked and we laughed and we shouted
At color and beauty so grand,
We stared and we smelled and we wondered
So sated we hardly could stand.
We slowly withdrew to a section
Exotic and quite beyond price,
Where bamboos exult in the sunshine
Of a botanist's real paradise.

But at length we had to turn homeward,
And took this fair dream in our heart:
But first we would visit Victoria
And see the great gardens Butchart.
We viewed the Pacific like Balboa
Then boarded the train for the East
And sped o'er the mountains and prairies
Still full of that wonderful feast.

At last we arrived in our county
And stopped at a dark Cedar swamp,
Where we saw a strange golden blossom
Attached to a slime-sunken stump.
In spite of the imminent danger
I clambered about for an hour,
Then turning slipped headlong in mire
But escaped with my life and the flower.

IN THE GARDEN

When Solar glory gilds the morn
And shines where I'm asleep,
I'm soon aroused to consciousness
From silent slumber deep.

'Tis then I sense the pleasant tone
Of Ipomoea's plea,
"Behold,it is the break of day,
I come to set you free"!

Yes,free to meet your other friends
Throughout your garden wide,
See here,how brilliant Cosmos says,
"Hello"! so starry eyed.

Now look around the arbour there
And gaze across the lawn,
You'll see the rambling roses blow
On that trim trellis yon.

Roses like blonds and brunettes shy
Speak sentiments of love,
And smile approval graciously
Like angels from above.

And by the wind-mill tall and strait,
The Giant Touch-me-not
Warns all intruders to beware,
He'll shoot them on the spot.

Beside the Golden Cedar Tree
A Hyacinth appears
To wish the morning's top to you
And meet the Sun with cheers.

While on the shed there sings a wren
With never ending song,
And scarlet crowned Bignonia
Blows trumpets all day long.

Close by a pool in garments green
Hid by a Golden-rod,
There stands a crimson Cardinal
With perianth of blood.

And creeping on the garden rocks
Petaled with pastel hues,
The lowly Trailing Arbutus
Says,"Pick whate'er you choose"!

Within the pool the lilies grow
From many a foreign shore,
And by their beauteous faces tell
Their story o'er and o'er.

Then there's the stately Syringa
With loads of Lilac bloom,
Which says,"Look at me,strong and tall
To dare the winds that zoom.

At right are Marigolds aflame,
In modesty unique,
With varied,velvet flowers crowned
In terms of beauty speak.

The Phlox so gorgeous on your left
Gleams in its pristine glow,
And thereby calls attention to
Its multi-colored show.

And there are spreading Peonies
Whose spheric buds and blooms
Ope gorgeous splendor lavishly
Where-e'er the day-star comes.

There on your left Delphinium
Stands like a sentinel,
To watch for every enemy
That might disturb our spell.

And then there is tall Buddleia
With royal color decked,
Arrayed with many purple spears
To keep intruders checked.

And now we reach the Dahlias
Both large and little ones,
The double and the single kinds
Presenting many suns.

And yonder in the eight-foot strip
Are Poppies blooming fair,
Of many kinds from many lands
And Orientals rare.

While gracefully Forsythia
Adorned with bell-like charms,
Spreads wide its golden canopy
And curves its slender arms.

W.G.C.

EULOGY

QUEEN M.A.B.

She is the queen of fairies,
Forever doing tricks;
She washes all the dishes
And wallops all the ticks.

She never can be idle,
Although there's naught to do;
She's always helping someone,
To chase away the blue.

She's jolly, fat and forty,
She's short and corpulent,
And when she sits upon my knees,
My lower limbs are bent.

When she throws plates, she misses,
And chases me for miles;
But when she's good she kisses
The part of me that smiles.

I tell you what, young fellows,
Be careful whom you wed,
For if you don't, you'll rue it,
And wish that you were dead.

Be sure and wed a fairy,
And be a fairy too,
Then you'll be always happy,
I hope you will, don't you?

About my wife whose initials are M.A.B.

HIS FAVORITE WIFE

She came to me from up above,
I clasp her in my trembling arms;
For she's a wagon load of love,
And has so many gracious charms.

She surely is a busy elf,
Forever rushing 'round the house,
To chase the dust from off a shelf,
Or scream for rescue from a mouse.

Her face is pink and round and fair,
Her forehead smooth as marble form;
Her lips are full of kisses rare,
But sometimes mutter like a storm.

When she runs at me through the air,
I dodge or crumple to the ground;
She sits upon my tummy there,
And wraps me with her arms around.

Her laughter is the best of youth,
Her smile is like a rare sunrise;
She claims to love the simple truth,
But still she often tells me lies.

And yet I love her like a fool,
Because she makes such pies and cakes,
And fills my dinner pail so full
Of peanuts, pickles and corn flakes.

Written at my neighbor's request.

PRINCESS ELIZABETH

Fair Princess of the royal line,
There is within this soul of mine
A flame of faultless loyalty,
That makes me wish to sing thy praise
Like courtier of the former days,
And swear my fealty.

I'd gladly be thy cavalier
To brave all dangers far and near,
And prove my mettle for thy sake,
Because I feel thou dost possess
The hall-marks of a true princess,
And have what it will take.

Thou art so gentle, strong and free
That everyone is proud of thee,
And should be if I rightly sense
The beauty of thy inner life
That will enhance thee as a wife,
And banish all pretense.

Let not mere blandishments profane
The regal nature thou didst gain
From forbears such as thou hast had,
But seek to emulate their best
And trust in God to do the rest,
Like good Sir Galahad.

Sweet daughter of the sweetest queen
We mortals of this earth have seen,
And of His Majesty the King,
We on the royal wedding day
Would from all lands beneath thy sway
Our gifts and glory bring.

Move on to greater majesty,
Yet, with refined humility
Employ the powers of thy youth,
Shine ever as a source of light
To guide thy people in the fight
For righteousness and truth.

Then Britons all the world around
Will serve thee with a love profound,
And if a testing day should come
And they were needed to protect
The throne, and keep invaders checked,
Next morning they'd be home.

DON'T CRY BOYS

'Tis great to win a game,
And greater still the fame
Of victors of the year;
And mighty plaudits go
To those who deal a blow
At enemies we fear.

'Tis great to hear a song
From thousands in a throng
That blocks a thoroughfare;
But then to come back home
Defeated and alone
Seems more than we can bear.

The greatest triumph then
Is quality in men
That smiles, and sets the will
For future combat keen,
And practice on the green
Like grinding of a mill.

Although the glory's great,
Recall the athlete's fate
When injured in the game,
Too many of these men
Have suffered much since then
For momentary fame.

Are fleeting honors worth
An early grave in earth,
Before one has achieved
His place amid the sun,
Or higher honors won
Or even fully lived?

Written when the Mustangs were beaten.

A HIGH HOPE

Art thou a Jew? Then gird thyself,
For thou art marked for Arab cruelty;
Yea, e'en that son of Abraham
Would thrust a dripping dagger in thy heart,
And cast thy helpless children out
To wolves and vulture-nomads who would take
Thy famous lands and cities fair,
Thy loved ones and thy sacred heritage.

Despair not yet my Hebrew friend,
Fear not, this hour in yonder shifting sky
Aglow, a new redemption gleams;
Thy crucifixion's cry has reached the stars,
And echoed back a promise, that
Will weld earth's Jewry into one great host
Which, neath that as a heavenly sign,
Ere long shall occupy its rightful place.

For dawn must follow dark, thy day
Shall rise resplendent, and for aye secure;
And thou and thine shall have thy home,
Where, in the hoary past thy ancient kings
Forged from a heathen circumstance,
A holy theocratic state, a height
Ne'er reached by any other race,
And unsurpassed in world-wide history.

The visions of thy prophets too,
Reveal a range beyond our normal ken,
For those with telescopic eyes,
Great souls, mahatmas, God-inspired seers;
And then thy sage philosophers
Are still beyond our dreamer's keenest thought,
With their deep insight and their reach
Of moral grandeur, regnant and sublime.

Thy poets sang about thy God,
They hymned his wondrous glory and his grace,
And all the covenants he made;
And how his nature he revealed by steps
Progressive, so to suit the stage
Of our unfolding and expanding mind,
And all within one sacred tome,
One holy book, the "Book of Books" divine.

Western Libraries acknowledges missing content from the original manuscript.

Pages 490-539 are missing from the scanned images of the manuscript.

EIGHTY YEARS

1.
When I had lived on borrowed time
A dizzy decade more than most,
Who fade at three score years and ten,
And seldom have a chance to boast
Of what they've thought or said or done
To gain a place within the sun.

2.
My pretty, scheming, better-half,
Unknown to anyone in town,
Planned how she'd fix a glad surprise
For her dear husband, as a crown
For many years of hectic life,
Endeavouring to please his wife.

3.
So when the anniversary
Of my grand, natal day arrived,
I saw the gorgeous plan unfold
As it had been so well contrived;
And then I knew that I would be
The centre of a talking bee.

4.
The first to come that happy morn
To join the fun for father's sake,
Were Pete and Sis and Robin Kay
From fair Toronto by the Lake;
They brought a score of daffodils
To garnish all the window sills.

5.
And placed a large Azalea
Fullblown upon my trembling lap,
And in my hand a well-filled sock
Which made my wondering eyelids flap;
I looked around and grinning said,
"Will someone quickly hold my head".

6.
But ere I could get off my chair
There came a telegram from Gord,
Together with a rose bouquet
To glorify our festive board;
I gasped,"That's from our second son,
And Doris, Barry, Marilyn.

7.

And then 'twas time for lunch you see,
So Mom and I and Sis and Pete
And hungry Robin Colgrove Kay
Looked round for something good to eat;
And then we had an hour's rest
Before we donned our Sunday best.

8.

When suddenly the doorbell rang
To usher in a troubadour,
Who sang the "Happy Birthday" song
Like Harry Lauder, as of yore;
His name is Wallace, famous Scot,
But with no kilties we could spot.

9.

By three o'clock some folks had come,
With gifts of several different kinds,
Of food and fruit and flowers rare,
And books from literary minds;
All afternoon and ~~in~~ night as well
They came to ring our front doorbell.

10.

The second group was ministers
From modest domiciles around,
Each with his wife upon his arm,
No better neighbors could be found
Whose years entitled them to be
True knights of this fine chivalry.

11.

And after them the doctors came
To shake my hand and wish me well,
And comment on my youthful form
And envy me a wife so swell;
They talked and ate and drank some tea
And then departed praising me.

12.

It was a great surprise, 'tis true,
And one that ne'er can be forgot,
Because its happy fellowship
From truly Christian love was wrought;
They made nice speeches, full of cheer
And wished I'd reach my hundredth year.

So thank you chilens for the way
You helped observe my big birthday;
When you are eighty I'll be there
To put you in your old armchair.

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TIDBITS

WHY, O WHY?

Why do the kids go naked now
So far above the knees,
That Old Man Winter gets a chance
To make them cough and sneeze?

Why do the pretty girls go by
So sparingly attired,
That nearly all men blink their eyes
And some are ill-inspired?

Why do the men wear gaudy socks
That fail to hide their skins,
And wrinkle down their bandy legs
And show their shaggy shins?

Why do they puff a pungent cloud
In anybody's face,
And fling the empty carton down
No matter where the place?

Why do they show their naked chests
Like some old grizzly bear,
And even let their sagging pants
Hang 'round them without care?

Why do the women wear their skirts
So high above the ground,
And why those horrid pantaloons
When dresses may be found?

Why square their shoulders like a box,
A scarecrow in a shroud,
And daub the features of their face
And look so cheap and proud?

Why chew that gum for ever more
And munch like yonder cow,
As though their jaws were motorized
And they can't stop, nohow?

Chapter XVI: Publications

Chapter 16 is missing from the scanned images of the original manuscript.

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Pages 544-557 are missing from the scanned images of the manuscript.

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Pages 558-562 are missing from the scanned images of the manuscript.

Bible -- The Old and New Testaments are of equal importance as
authoritative message of God to man and should be read in their
al sense except where metaphorical or symbolical language is
These may be easily distinguished.
Sacraments -- They hold to immersion as the proper mode of bap-
but that children are not to be included. They observe the
's Supper each Sunday just as the Disciples do.
Christian Duty -- This is briefly summed up in the text thus,
e not the world,neither the things of theworld;If any man loves
world,the love of the Father is not in him,for all that is in
world: the lust of the flesh,the lust of the eyes and the pride
ife is not of the Father but is of the world,and the world pass-
away,but they that do the will of God shall abide forever".
Consummation -- Man's death is a state of nonexistence until the
rrection and judgment determine his destiny. Judgment will be
ensed only to the responsible classes of mankind,the rest are
r raised but perish like the beasts in the second death which is
hilation. At the resurrection the dead come forth in the natural
to be judged. Immortality is a deathless bodily existence to be
ined by the righteous at the Second Advent.

Second Coming -- This will be preceded by great wars,commotions
distresses together with terrible judgments to teach the world
teousness. The Jews will be returned to Palestine. After the
urrection and judgment Christ's people will receive the gift of
ortality,for the first and only time, and become His assistant
gs and priests on earth. Jesus is the coming destroyer of all
an governments and will reign over all nations for a thousand
rs with headquarters at Jerusalem. All this may come to pass
ing the present generation as a fulfilment of the covenant once
e with David, which was to the effect that Christ should sit on
throne of David in the time of the restoration. Luke 1:32,33.

~~Hymnology~~ --

~~Organization~~ --

~~World Mission --~~

THE IMMORTALITY OF THE SOUL

my answer to a special preacher

In submitting this very brief review of your discussion I do not set elf up as a judge but as one who desires to discover the basic truth in creed of the Christadelphians. To do this properly one should sift each m prayerfully and with much historical and Biblical knowledge. We must honest in our choice of reference and in our method of interpretation, erwise this is just a waste of time.

The story of the gullible king was interesting but not apt. To say at the theologians of the orthodox school are as unscrupulous as was that ing merchant, is, of course, libelous and absolutely false because the theo- gians and philosophers of each generation are intent on discovering possible rors in the thinking of their predecessors but, notwithstanding extensive itical research, have found their work to be satisfactory and have corro- rated their findings. "Millions of people" are therefore NOT fooled by st such a yarn".

You claim to have definite proof, both experimental and scriptural at the doctrine of the immortal soul is a "gigantic hoax". Let us see. irst, you say that the crafty serpent introduced the idea. That is no doubt alse because the serpent did not say, "Ye shall become immortal" but only hat she should not die immediately, and this is clearly indicated in Gen.2:17 here the proper translation is, dying thou shalt die, or thou shalt begin nd continue to die. The serpent did not refer to immortality but only to udden death. Your reference to this passage is then a glaring example of areless choice and of improper interpretation.

Second, you say this has been the "chief" flapdoodle of priestcraft for centuries. This may be true of some but it is certainly not the chief trine of orthodox theologians today, and you know it, so I am surprised at r stooping to misrepresentation. Our chief doctrine is John 3:16 and you know t too. Then, when you liken yourself, and those who are gullible enough to llow your teaching, to the court jester, I think you make a very good compari- n, but when you say your minds are limited to the things you can actually see, am again greatly surprised. Such simple minded folks then don't believe in visible things like gas, electricity, magnetism, gravitation, or music. No, no, u are not that simple, but only pretend to be so for the sake of argument before ople that you are quite sure will not be able to criticise your remarks. You rsake the Bible when you profess such limitations because it is the one book at stresses the unseen as the true reality.

Third, you probably realize that we poor benighted orthodox folks can just easily, and with more reason, point to you simple people as having "itching ears". n't you think that's fair? But you continue your flapdoodle by claiming that rthodoxy has no experimental proof of the soul's immortality, but you seem unaware hat your own so-called experimental proof of its falsity is based upon another alse interpretation which I shall now expose. Why didn't you refer to John 14:2, 3? ecause it would have defeated your point, and in spite of the fact of Jesus you urther assert that there never was an immortal soul that donned a mortal body. ou agree that He arose, do you not agree that He is immortal? That is *our* experimental proof. Can you question it? The quotation from Wordsworth was never, under any circumstances, thought to be a statement of creed but only a poetic phrase, and you know that no one is fool enough to believe in it that way. Why drag it in?

Yes, in spite of your "illegitimate, ill-conceived, misfitting" and biased argument, we believe that the Creator who effects the regeneration of the human soul by a spiritual rebirth, can and does bestow, on each conceived child, immortal soul, no matter what the circumstance, since the child has no respon-ility for its birth. That, however, is not the Divine method of populating aven, as you well know, because the possession of a soul is not the key to heaven, t the possession of a regenerated soul.

Fourth, you quote Paul in Rom. 2:7 as saying that immortality is acquired patient continuance in well-doing, but you know, as well as I do, that is only rt of his teaching, for he also said that we must live and achieve our eternal ward by faith. That is a faculty of the soul. More than that you were very fair to him and to your audience because you refused to quote the whole verse ich adds to immortality also eternal life. Now, eternal life is spiritual and eavenly and has nothing to do with life on earth for 1,000 years. That is where our thesis is at fault. You are arguing in favor of a resurrected body to live ere for a mere thousand years while we believe in an immortal soul that will live ternally in heaven. And we are sure that this is in full accord with the teachings f Jesus and the apostles.

Fifth, you say the orthodox theory is exactly opposite to what the Bible mphatically declares. Once more let us examine your claim. In the first place the Bible paints a dual picture of life, and in this quotation from Eccl. it presents the thought of a man that lived his life without God and according to your theory he was not worthy of a resurrection but must forever remain imprisoned in his grave. But the Bible does not teach that, it expressly states that every one must come to judgment no matter how or where they died or what was done with their ashes. On that great day, which has no connection with 24 hours, it cannot be necessary to reassemble all the atoms of every body but only to bring a record of the things done therein. The proper interpretation, therefore, is that these present bodies of ours will never be raised but each immortal spirit will receive a spiritual body entirely unsuited to the earth.

On page 3 you say that since no one has ever caught or seen a soul depart- from a body, and since it doesn't function when we are asleep or dead it cannot st, and then you add that when man cannot see or hear or think he is dead. How ve, have you never read how psychology shows that in spite of accident or anes- tic there is something like a quiescent soul which continues to operate the chinery of respiration, pulse, digestion and cell development. That is where the ilor's soul was during his bodily lapse.

On page 4 you launch again on some futile nonsense based on your totally proved assumption of no soul and you try to make out that life is the result of n impersonal, soulless operation of our faculties. You are as far from the cts as was Herbert Spencer when he said that life was brought about by a fortuitous concourse of atoms" or that it is the "continuous adjustment of internal lations to external relations". Both are wrong as explaining the origin of life. he second is true as an explanation of the continuance of life while the first had s funeral years ago. You shouldn't drag out such antiques, they expose your bernation.

On page 5 you say that every reference to man prior to Christ's return demands that we recognize man's mortality and refutes any supposition that he has an immortal soul or spirit. And, what's more, that you are prepared to back it by clear dogmatic scripture. Let us see.

In the first place Paul did not stake his future existence on the resurrection of his body apart from his soul, because he plainly stated in Phil.1:23 that he had a desire to depart and be with Christ. Now, where is Jesus? In the grave? Paul said He sits at the right hand of God, Col. 3:1. Surely that means he believed he would enter upon spiritual immortality after the resurrection and judgment. Your own dogmatism glares at this point and shows that you are simply ying a period of wishful thinking and that your argument is as dried out an empty cocoa-nut. At the bottom of the page you say that Paul could not said certain words if he believed in the immortality of the soul. You wrong about that because Paul believed in both resurrection and immortality r the one cannot be without the other because they have to do with spirit. ur trouble arises from your refusal to see this or at least to admit it. ere are plenty of passages in his writings to prove it. See 1 Tim. 1:16, Tim. 1:10, 1 Cor. 15:53, and Rom. 8:17. but you or whoever first wrote your tes is determined to produce only one-sided evidence.

On page 6 you indulge in some more old-fashioned notions. Why do you t keep up to date? It is many years since the orthodox folks taught that at eath we go direct to heaven or hell for we know that no one goes to their final ace until after judgment. If the folks who are still teaching this would read heir N.T. they would know better. You see we think alike about this, but you ill be satisfied to stay 1,000 years on earth while we would go to heaven. Your discussion about being absent from the body and present with the Lord is valueless because you begin splitting hairs by saying that being absent does not necessarily mean being present. Anyone can do that, but it is only speculation. Since you profess to believe that there is no soul, you will have to resort to wresting scripture and arguing about old-fashioned ideas. Don't you realize that to thinking people you are fighting a straw dummy which you have set up? Then you turn to the second coming of Christ and you immediately create another dilemma about our going to Him and His coming to us, and you decide that it must be the way you want it for your argument. That looks very much like begging the question but we are not blind.

On page 7 you carefully slip over the phrase "eternal in the heavens". That is the immortality in which we believe, as I have said before. Why do you lay that trick so often? Why not be honest with scripture? Surely you do not pect to make out a case by twisting and turning and cork-screwing around the ord of God. The word from which you have underlined does not mean out of but dicates quite clearly that it has a spiritual connotation. This is proved by erses which follow. Contrary to your opinion then, I submit that this shows hat Paul was "an immortal soulist". But again you play the dirge on the same ld string of bodily immortality. You must see by this time how it lacks scripural warrant. Six lines from the bottom you refer again to the worn-out idea f going direct to heaven at death. Do you not think it is time to eliminate the comedy?

On page 8 you quote Paul re his crown of righteousness which he is to receive, as you say, on the day of resurrection. But you must not forget that the final awards are not given until after judgment. They are not earthly things but heavenly, spiritual and eternal, and have, therefore, nothing to do with the kind of bodies that would be suitable for an extended stay on earth such as you have in mind.

Then you refer to Christ's appearing and declare that there is no place for an immortal soul on the day of judgment, but your idea has no confirmation in scripture. Your own chosen passages from Tim. are not properly used because you again purposely overlook the fact there stated that Jesus is going to judge the dead. How can they be judged if they have no soul? It goes without saying that judgment cannot be passed on dead bodies. It is the soul or spirit which must stand before the judgment of Christ, not the body for it was the spirit or soul which did the things which were done in the body. The Bible states that the dust (body) shall return to the earth as it was, and the spirit unto God who gave it. That is the entity that must face judgment. Then you quote again the passage about "itching ears" only to make me sure this time that it is the ristadelphians who have them. And you agree with a certain Dr. Laidlaw who id that the idea of the immortality of the soul took the place of the idea of e future life. Why shouldn't it? It is better and more true to scripture no tter if Plato did think of it. The thoughts of a pagan philosopher are not l pagan, and it seriously undercuts your argument. Then you quote Gladstone the fond hope that you would gain some real support for your nonsense, but u failed to see his point, which is that *natural* immortality apart from vine aid, is not mentioned in scripture Of course it is not, it is only a ilosophical opinion which has been thoroughly contested, disproved and buried oblivion.

On page 9 you summarise your half-baked, half-informed argument so I hall stop and hope that you will have an interesting time digesting my various oints which are made with the desire to discover any possible truth that may be idden like a needle in a hay-stack.

Thanks again for the loan of your notes which I now return.

Sincerely yours,

W.G. Colgrove.

all caps

2. Christian Science ---
Origin - The author of so-called Christian Science was born on
16, 1821 in the village Bow in the state New Hampshire. Her
was Mary Mason Baker but from time to time she added three other
s and before her death was known as Mrs. Mary Mason Baker Glover
erson Eddy. Mr. Glover died within six months, then after nine
's she married Dr.Patterson who deserted her after fourteen years
from whom she obtained a divorce. Later she married Dr.Eddy who
after five years in 1882. In 1870, after much reading of meta-
ical theories, she wrote her first book, "Science of Man" and in
published "Science and Health". In 1880 she moved to Boston
organized a church without a creed but with 26 members. In 1883
began the Christian Science Journal and three years later the
ional organization was completed in New York. In 1890 she revised
nce and Health and in 1894 the first Christian Science Church was built
Boston at a cost of 2,500,000 dollars and free from debt. It was
decided that pastors and sermons were to be discontinued. In
6 she opened the Massachusetts Metaphysical College and two years
er the Christian Science Weekly, now the Sentinel, was established.
1901 2,000,000 dollars more were voted to make alterations to the
her church in Boston. Where did the money come from? The gullibles.
In 1906 both the New York World and the McClure Magazine exposed
whole affair and several American scholars wrote books to point
the fact that her ideas were neither Christian nor Scientific,
.Eddy now moved to a large old mansion hidden among trees and was
dom seen again. She received no patients and died like a human.
It was my duty, as a student in theology in Boston University for
ee years, to become well acquainted with several of the religious
ts there during 1906 to 1909 when this strange religio-metaphysical
t was making its remarkable miraculous claims. STORY OF BOOK
additions to, alterations of, and subtractions from Scripture are
numerous to mention and should make her eligible for the punish-
ts detailed in the last verses of Revelation.

note date about 1844

Doctrines - They claim to have no creed nor doctrine but only a
religious tenets:- The acceptance of the Bible as their guide to
ernal life. The acknowledgment of one Supreme and Infinite God,
s Son Jesus Christ, the Holy Spirit and man in God's image. The
ct of God's forgiveness of sin, with the understanding that evil is
real and hence not eternal. The atonement of Christ as the evidence
divine love in healing the sick and in overcoming sin and death.
e crucifixion and resurrection of Jesus as proof of the allness of
irit and the nothingness of matter. But the way these things are
hashed and restated is, to say the least, very peculiar. In spite
this it appeals to those who think they find in it an escape from
e requirements of true Christianity. Let us, therefore, examine it.
For this we shall turn to chapter 14 page 465 of Science and
alth where the authors have given us a Recapitulation of tenets.
When we study the books we find a much more extensive treat-
nt of these ideas but when these are stated the writer will not
tempt an Appraisal at the end but leave that to his listeners.
Regarding God - They hold that He is the only Divine Principle,
preme Mind, Spirit, Soul, Life, Truth, and Love. That His attributes ~~ar~~
re justice, mercy, wisdom, goodness and so on. That God is real and
herefore sin is unreal. God, which is the mind of man, never sins.
od originally was the standard of perfection. The relation of God
nd man, the Divine Principle and its idea, are indestructible in
cience and Science knows no lapse from, or return to, harmony but
~~elds the~~

the Divine order,or spiritual law,unchanged and all that God
es is perfect and eternal. God has set His signet to this science,
making it coordinate with all that is real,harmonious and eternal.
Regarding Jesus - They say that Christ came to save sinners,but
also declare that sin is unreal. Just why Jesus died to save us
that which has no reality is hard to understand. If we ask what
of logic this is,they answer,it is metaphysics. And if we ask
kind of metaphysics,they can only say,our kind. Where are we?
st is the ideal truth that comes to heal sickness and sin".
is is the man who presented the healing idea of God".
is came to destroy sin,sickness and death".
is was the highest human concept of the perfect man",and one with
ist the Messiah,the Divine Idea of God outside the flesh".
us awakened Lazarus from the dream of death". What shall we do
these so-called metaphysical definitions ?

Regarding Spirit - They say that "the terms souls and spirits
he plural mean nothing, but Soul and Spirit signify deity and
ing else". "There is no finite soul or spirit, such an idea is
man-made". "Since Soul is immortal it cannot sin,for sin is
the eternal verity of being". Spirit is real and eternal,matter
nreal and temporal". Spirit is God and man is His image,hence
is spiritual and not material".

Regarding Man and Sin - Let me now introduce you to some very
lved metaphysical theory. They say "Man is and forever was God's
ection". "Man is incapable of sin,sickness and death because his
nce is from God", "Mortals are the counterfeits of immortals,
dren of the wicked one who declare that man begins as a material
ryo". "Mortals are not fallen children of God,they never had a
fect state of being which they lost and may subsequently regain".
an is not a material habitation of the Spirit but is Spirit".
l is the divine Principle of man and never sins,hence the imm-
ality of the soul"."That,in man,which sins is not the Soul but
erial sense"."It is the sense of sin that is lost,not the sinning
l"."The belief that life can be in matter,or soul in body,and
t man sprang from dust or from an egg is the result of mortal
or". All very simple indeed.

Regarding Redemption - They say that man is found in two very
ferent conditions; in one he is called mortal and a child of
an. In the other he is called immortal and the pure image of God.
can rise out of the former through the study and practice of
istian Science until he has become wise enough to disbelieve his
ful condition. He will then be ready to be forgiven because sin
necessary in his life.

Regarding the Church -
" " Ministry - Lay readers only
" " Bible - A reference book,needs Key to the Scriptures
" " Sacraments -
" " Christian's Duty - Spread the theory and practice
" " Consummation - of Christian Science.

" " The second coming -
" " Hymnology -
" " Organization -
World Mission -

3. JEHOVAH's WITNESSES

RIGIN -"Jehovah's Witnesses of modern times are merely the f a long line of God's earthly servants" Some time in the Charles Taze Russell, a Presbyterian layman, became dissat- with the interpretations of Scripture obtained from certain leaders and set up his own class for Bible study in Alle- Pennsylvania. After a while this group claimed to have found ruths regarding the closing of Gentile times and the second of Christ. We think this looks very much like wishful think- n 1874 they published a booklet entitled, "The Object and of the Lords return" In this the advent is described as in- e rather than physical, and that the earth will not be burned en Jesus comes. Russell and his associates now founded the y Bible Magazine and published the proof that the end of the e times would come in 1914. About this time they began preach- rom house to house. Other similar groups sprang up and sought with them, so it was thought wise to appoint certain members everywhere organizing new societies. In 1881 they became the Watchtower Tract Society and soon flooded the country with s and later boldly stationed their distributors in front of churches on Sundays. In 1886 The Divine Plan of the Ages was shed and in 40 years reached some 6 million copies in several ages. In the next year a charter was obtained and Mr. Russell lected president and they became known as Russellites. In 1898 built a new printing establishment called the Bible House. en came the period of attacks to try and offset the inroads of nism and evolution and combat the leaders in a variety of de- launched by certain religious bodies. In 1909 they bought the of H.W.Beecher and his church which they renamed Brooklyn Tab- le. The next year they organized the News Club and provided material and sermons for many news papers. In 1914 they brought he Drama of Creation, one of the early talkies. During the war s shown to millions at home and abroad. In 1916 Pastor Russell and Judge Rutherford succeeded him and continued for 25 years s battling protagonist. There now followed a period of trouble ch many witnesses were arrested including the president. This he cause of much dissatisfaction and many fell away. But after e the tide turned and they began a concerted effort to recall dispersed membership. They founded a new magazine called the en Age but, on account of so many war casualties, they changed Consolation. In 1931 they took their present name. It was at time that they claimed a revelation that Christ was coming soon so Judge Rutherford preached his great sermon, "Millions living will never Die" In 1935 it was further revealed that not would there be a church of 144,000 members in heaven but that a e would also be a church with an unstated number of members left arth for all eternity. In 1938 they decided to become a Theocra- organization. In 1939 the recent world war began another period rouble and hardship for them, largely because they refused to go ar. It was during this time that Judge Rutherford passed to his rd in January of 1942. In the same month Mr. N.H.Knorr was called ill his place. Last year 1946 they held a world-wide convention leveland, Ohio to which over 50,000 members and friends assembled was a huge success as reported and pictured in their "Messenger".

ctrines - They are strict fundamentalists.

rd -- He is Jehovah the Almighty Creator of heaven and earth. He is the fountain of life and salvation. He shows favor to all men but few appreciate it. Christendom has drifted far away from God and the Bible. In due time He will establish His kingdom on earth.

esus -- He was the first of God's creative works and thereafter it was He who brought all things into being, visible and invisible. He is the image of the invisible God and was the Word made Flesh who died for as many as obeyed Him. He was raised from the dead and waits at the right hand of God.

pirit -- They believe in the power of the Holy Spirit as the divine inspirer of each witnesser. Their watchword is "Not by might, nor by power, but by my spirit, saith the Jehovah of hosts".

rinity -- God and Christ are not one as in some heathen trinitys, The trinity idea is not found in the original manuscripts but was put in the later ones through pressure of the R.C. hierarchy. God and Jesus are one in purpose and effort but not in person.

an and Sin -- They say that a careful study of the Bible shows that hell is the grave and that there is no fire or burning torment. The punishment of the wicked is everlasting death not torment. God seeks to save not to destroy.

Redemption -- This is secured through the death of Jesus and the faith of His followers. Salvation is a life process made successful by the believer's faith in Christ and his good works as a faithful messenger of the truth and the kingdom.

Church -- The church is a body of members like living stones built up in a holy temple with Christ as the chief foundation stone and head of the church. In the final church in heaven there will be 144,000 members.

Ministry -- This agency is developed in the Theocratic School Their ministers profess much knowledge of the Bible while their ordinary lay workers are called pioneers, missionaries, publishers and witnesses.

Bible -- It is the word of God and should be taken as we find it in the best translations. They use the American Standard Version. The earthly kingdom of God began immediately after the first world war.

Sacraments -- They practice immersion in baptism and last year 1946 at their world convention baptised over 2000 persons. There was no mention of the Lord's Supper.

Christian Duty -- They must be good citizens and faithful servants of the society.

Consummation -- After Armageddon the earth will be made a paradise for the people of God who will remain here for all eternity.

all caps

4 ~~3~~. Latter-Day Saints ---

Origin - This is a religious sect whose early history is that ts founder Joseph Smith Jr. who was born in Vermont in 1805. rding to contemporary accounts his parents and grand-parents , superstitous believers in dreams, visions, witchcraft and demons. imself, was called a visionary, a fanatic, an imposter and a lib- ine, but the Mormon people seemed to think of him as a prophet, eer, a martyr and a vicegerent of God. They admit that as a boy could hardly write his name. He was converted in 1820, retired a solitary place and through prayer fell into a trance in which saw a pillar of light above his head brighter than the sun with persons standing above him in the air. A second vision in 1823 that of a heavenly visitor who revealed the location of the den plates on which he said the Book of Mormon ~~were~~ was engraved. s of course is ridiculed by the critics but believed in by the mon people and held as divinely inspired records. His supposed nslation of the plates, which are said to be in reformed Egyptian, a very ancient prophet Nephi, is the present sacred book of the urch and is regarded as superior to our Bible because it is more gmatic and commanding. The translation was begun in 1827 in New k and published in 1830. This original edition is said to be lost his scribe had a duplicate copy from which , during the next ten ars two other editions were published. In 1830 Smith claimed that had received a revelation which said, "Thou shalt be called a seer, translator, a prophet and an apostle". The first Mormon church was unded and as a result of some campmeetings someone claimed to have ceived a revelation that the Mormons of New York should move imm- iately to Ohio. Their leader Sidney Rigdon soon had them on their y and was joined by Smith but their joint business ventures failed d they escaped to Missouri. Soon the rest of them followed, but account of endless strife with the nonmormon population, they were dered to leave the state. They now chose to go to Illinois but, on count of their peculiar notions and their polygamous practices, ey became involved in worse disorders and even murders. Once more ey had to move, this time to Iowa. During their stay in this state ith was assassinated and the notorious Brigham Young succeeded him d claimed to have found in Smith's desk some papers containing a evelation to the effect that polygamy should be practiced to speed the increase of population. He also held that Adam was God and roceeded to inaugurate a number of unusual methods. ~~which extreme large group of Mormons who decided to~~ To carry out these odd ideas hich were opposed by many he moved the whole organization to Utah ear Salt Lake City. Those who could not accept his innovations soon eturned to Missouri and set up a new home at Independence. They are till Mormons but do not believe in a number of the things which the tah people practice. They are the Latter-Day Saints of London and elsewhere. Finally, as we all know, the U.S. government ut a stop to polygamy but did not rule against some other matters.

Doctrines - Since they publish a booklet entitled, "The Book of rmon Evaluated" we shall examine it for what basic truth it has, d you will no doubt notice that our criticism is a devaluation. page 5 the evaluator says that IF he should discuss the incul- ations of the Mormon Book he might safely claim that it will rival e Bible in its moral teachings. We say, what of it? Does he think at the Bible fears rivals? It does not, but it does hate pretense, evarication, subterfuge and misinterpretation such as he favors. et us see what his argument looks like. We think of the Bible as a aithful mirror of human life, It spares no one but exposes the sins f even the chosen people. The Mormon Book refrains from this.

ium. A comp
arance and
ose in a

rise out of a soc
he occasion for its
n it was to take.
iedness, called by

aluator further says that its high moral teachings are a strong
nce of its divine origin, when he knows full well that it is ~~ev~~
ace of its moral quality only.
page 6 the Evaluator says the Mormon Book is either what it
s to be or it is a stupendous fraud. Let us follow his argument
iscover that it is the latter. Evaluator says desire for fame
esire for wealth are the greatest motives that activate men.
ink this shows that he had a superficial view of the matter
se there are others even more powerful,eg. the overruling and
ional egotism of some people,along with their natural untrained
yncrasies,that make them think they are inspired. What kind of
ration can it be that makes them write some of the stuff which
eader may find in their curious books? From the standpoint of
ology it is the work of a disordered mind. To one skilled in
cal study it is very evident that roughshod garbelling,twisting,
terpretation and plagiarism of Scripture,often without acknow-
ent,makes the worst case of sacrilege in literature. How could
e a partner in the dissemination of such half-baked stuff, esp-
ly when whole sections of the New Testament are professed to be
ords of one or another of their so-called prophets? Their claim
these prophets received their information direct from Christ in
ica is too silly for words. The other similar claim that an evil
on could not write faultless teaching is,of course,unfounded
use it could be done by a person with the overruling egotism of
ph Smith Jr. And don't forget that he was an untrustworthy cit-
and a fugitive from justice.
n page 8 Evaluator tries to say that the words of Luke about a good man are app-
ble to Joseph Smith Jr. but his real character has been suffic-
ly exposed. And the quotation from Jeremiah about the leopard
its spots really does fit him because we can see his spots
t through his contemptable camouflage. Evaluator now assays ~~to~~
how why their Book is so important,but we ask, what real value
it contain? What advance has it made on Christian literature?
ay,if you want"to get the right perspective" you will look to
rn history, not to some presumptuous guesswork about unknown
s. Evaluator and those before him would have done much better
they placed the origin of their cult on the Lost Atlantis where
ould never have been followed and exposed.

On page 9 Evaluator says,"The Book of Mormon claims to be history
it was wise of him to use the word CLAIMS because he knows it is
y a claim. The man who wrote it was no doubt a fakir because he
unable to find out the information he pretends to know. The so-
led prophets were mere figments of his disordered imagination.
in in the middle of the page the IF is well added because the
ims of those mythical prophets and their pretended visions of
ords are too childish to merit attention. At the bottom of the ~~pa~~
e and at the top of the next page is a bungled attempt at plag-
zing part of the Revelation of John, ~~and~~ The reference to certain
ORDS draws from Evaluator the remark that they refer to the Book
Mormon which teaches that the Lamb of God is the Son of God and
t when it is accepted as part of the Bible it will restore some

in and precious things that had been taken from the Bible. But we
not find such material in their Book. Surely this stuff will not
ome part of our Bible until we have all gone crazy too.

ɔn page 11 Evaluator says that the Book of Mormon teaches Christ.
is quite true but it is also true that it is done by the unholy
s of a garb~~e~~led paraphrase of the New Testament as shown by many
ations from the nebulous Nephi.
n page 12 Evaluator says,"I will state that the quotations were
writen about 600 years before Christ and that the prophets claimed
ave had the five books of Moses and also all the biblical prophets
to Jeremiah,and that much of their knowledge of Christ,long
re He came,was received by revealments of the Spirit,of dreams,
isions etc. What must a careful reader think of these statements
there is no satisfactory historical evidence for them? It would
that those imaginary prophets or their recorder thoroughly enj-
imitating,counterfeiting,perverting,plagiarizing,garb~~e~~ling,mis-
rpreting,adding to and subtracting from Scripture. We feel sure
real perpetrator of these heresies must also merit the punishment
ioned in the closing verses of the Bible.
n page 15 Evaluator says that the records previously mentioned
esent the Book of Mormon and on page 6 the word stick means
RD so that we are treated to a double case of misinterpretation
ause we know that the stick of Ezekiel has no such meaning but
ers rather to the two sections of the Jewish People - Israel and
ah. His argument is therefore without foundation and false.
On page 17 Evaluator says he has presented strong claims regard-
the divine origin of their Book and that now he will give equally
ong and cogent reasons why it should be respected by Christian
ple everywhere. We say,what in the name of common sense do we
t with a hodge-podge such as that when we already have the Bible?
On page 18 Evaluator says,"When the Book of Mormon came forth".
should have said,When it was surreptiously brought forth.
On page 19 Evaluator says,"I think Isiah foresaw the coming forth
the Book of Mormon,for in his 29th.chapter he mentions"a book that
sealed". But Isaiah does not refer to a book in any such sense,
to a vision which he says is as little understood as a sealed
k. This is so very clear that anyone can grasp its reference.
On page 22 we are told that there is something new under the sun
the form of a dogmatic statement that,"An acceptance of our Book of Morm
l bring harmony out of chaos". Now the new thing is that CHAOS
eir book) will bring harmony out of chaos. That is something.
On page 25 we are told that"the last quotation on page24 is the
port of the words of Christ himself as He preached to the people
this American continent,giving explicit instructions as to the
pose and mode of baptism".He further adds,"This settles the
estion of the mode". If this is not dogmatism gone to seed, we
uld like to know what to call it.
On page 30 Evaluator says,"It is reported that immediately after
e appearance of Christ on this continent the two original nations
re all converted to Him and remained united for 163 years. But if
u ask,"when or where,the only answer is a shrug of their shoulders.
On page 35 Evaluator says that Mormon,another fictitious prophet,
id that"the earth shall be rolled together as a scroll". Of course
was copying the New Testament picture but felt he should cover up
s plagiarism by puting the earth in the place of the heavens.

But now let us say that we are greatly pleased that the Reorganized
urch of Latter-Day Saints does not believe nor practice some of
e doctrines of the Utah Church. Nevertheless they still have many
atures we should like to see altered for the sake of a united and
erful front against sin and for right living.

4 Appraisal of the Latter-Day Saints Teachings

Go --- They believe in God the eternal Father but they do not believe that God evolves as do the Utah Mormons. Therefore they refuse to subscribe to their doctrine,"As man is God once was,as God is man may become".

Je us --- They believe in Jesus Christ as the Son of God and the Saviour of the world.

Sp it --- They believe in Him much as we do.

Tr ity --- This item is not very clear.

ve and Sin --- They believe that all men may come to salvation from their own sin by obedience to the laws and ordinances of the Gospel,which include faith in God and the Lord Jesus Christ,repentance for sin,baptism by immersion, and the laying on of hands for the gift of Holy Ghost.

Re emption --- They believe that through faith in the atonement of Christ we are redeemed from original sin.

Ch rch --- They believe in having the same type of organization as prevailed in the early church and that its worship must be in spirit and in truth.

M istry --- Following the above,they have apostles,prophets,pastors, evangelists and teachers.

B le --- They believe that it is the word of God but that it is not yet complete since God is continually making revelations to their leaders which should be included. Also that certain gifts are still being bestowed, such as wisdom,faith, healing,miracles,discernment of spirits and the interpretation of tongues. Their Book is superior in moral teaching and in [illegible]

S raments --- They believe in immersion as the only proper mode of baptism and they do not practice polygamy.

C istian Duty --- They believe as we do,both with regard to government authority and moral obligation.

C summation --- They believe in the resurrection of the physical body,that the dead in Christ shall rise first at His second coming when He will begin His millennial reign. The rest of the dead will not live again until after that period when a second resurrection will take place for final judgment. They believe in punishment of the wicked that will match the degree of evil committed. In other words they are dyed-in-the-wool fundamentalists.

econd Coming ---

ymnology ---

rganization ---

orld Mission ---

5. ~~4~~. SEVENTH - DAY ADVENTISTS ---

Origin - This enterprising organization is one of a family of igious sects which started from the preaching of William Miller New York state in 1831. His ideas, like those of some of the other s, arose from his uninformed studies of the prophetic books of Bible and he concluded that the end of the world would take ce in 1843 and be followed by the second advent of Christ and the uguration of His millennial reign. When the date came and no loud mpets were heard it was decided to put the great event forward year to October 1844. This date also came without trumpets and, a conference it was further decided to announce that when Jesus se to return it would be a visible, personal visit at an early but efinite time. This family of sects includes : Advent Christians, ngelical Adventists, Life and Advent Union, Church of God, and rches of God as well as the one we now have under discussion, The enth-Day Adventists. This is the largest group and the one to add enth-Day to its name. The Church of God was set up by a small but ter informed group that refused to believe in the inspiration of e peculiar writings of a Mrs.E.G.White.

not 1844

It is quite probable that most of the ministers of the is city eived a copy of their booklet entitled, "Seventh-Day Adventists, ir work and Teachings". One came to me and I use it for our dission. It is very nicely gotten up with an attractive cover, but I surprised to find inside and on the back some pictures that are elated to the subject of the booklet. Why a picture of the House Commons in session followed by one of the Royal Family and also hird one of the Peace Tower on the back? It looks like a strained alty gesture since ~~you~~ they do not believe in war, even when it can't be oided. To others it looks like a trick to make the unsuspecting ader think that the Canadian Government is ~~your~~ their chief backer. to still others it looks as though ~~you~~ they have taken a cue from the ish heirarchy who capitalized the cessation of hostilities by iding mass in the archways of the tower. Then on examining the cture on page 6 we were struck by the strange arrangement of the rth among clouds such as do not exist in space, and a pillared rtal faced by a vast crowd of people standing on nothing. We know at it is supposed to be artistic but we submit that a young reader uld not find much satisfaction in such a flimsy representation of ligious ideas. Again, when we see the picture on page 12 we wonder ~~your~~ their choice because, although it is by a great artist whose name Hofmann not Hoffman, it is not true to the Jewish posture in prayer such an occasion. Matthew and Mark both say Jesus fell to the ound. These items we know are not very important but they make inking people hesitate to accept the very thing ~~you~~ they are trying to t across. The ~~rest of the~~ pictures portraying the Second Advent and Judgment are so far-fetched that we frain from further comment.

Doctrines - In chapter 1 the writer says, "People everywhere are quiring about us". We say, don't fool yourself, they are not doing , but that is what most peculiar religious groups think. But he es on to raise a number of questions that he may answer them in roit advertising. Every thinking reader sees this trick and begins once to discount his subsequent remarks.

In chapter 2 the writer speaks of "the inmost heart and central re of Adventism as Jesus Christ and His early second coming." seems that no amount of disappointment and delay can teach some ople that they are on the wrong track because of incorrect interretation of Jesus' words and a misunderstanding of history. ~~The arger denominations believe all the things mentioned except the cond advent in physical form.~~

writer also says that they believe that immersion is the only
r mode of baptism, but we think that it is not the mode but the
plished fact that counts. In the case of children it is done only
Christian parents promise to teach them its significence as
as they are able to understand. We notice too that the writer
s an error when he says,"the salvation and redemption of man
been accomplished" because man's salvation requires his consent
e his redemption was secured without it. Salvation is a growth.
n chapter 3 the writer says we believe man does not possess
rtality in himself but that he may have it by accepting it as a
from God. They say that when the body dies,the soul dies, but
e will be a resurrection and a future life. No souls go to hell
eaven at death,but only to the grave where they will remain
l their resurrection. But the Bible says that the soul returns
od who gave it. Since Seventh-Day Adventists accept the Bible
ivinely inspired and without error they should reexamine their
rpretation. Then too God made man in His own image,not physical,
his soul is immortal and cannot die,as they seem to believe.
eel there is no doubt that the body will lie in the grave forever,
the spirit which returns to God will be provided with a spiritual
,of which Paul speaks.

n page 23 The writer quotes from John 14:1-3 where Jesus said He
ld go and prepare a place,and that the S.D.A.believe that it will
a real,material,tangible,actual place in the Father's house which
course is a material heaven. This is certainly a strange notion,
it wouldn't be so bad if they held the Christadelphian view that
millennium is to be on earth. The fact is,however,that they do
so believe. They precisely state that it is to be in heaven,and
its close the wicked,including Satan,will be destroyed by the fir
es of the last days and be finally annihilated. There is no such
ng as eternal torment,but rather eternal death.

In chapter 4 the writer makes a very strong statement to the eff-
that the S.D.A. believe that the ten commandments are unchang-
e moral precepts that are binding on all peoples everywhere for
time. That the seventh day Sabbath was instituted by Christ when
made the world and they are prepared to show that this identical
has endured through all the centuries and that it is the same
bath that came from the hand of God. They point out that there is
record that the first day was appointed to supplant the Sabbath,
at it was never blessed,was never declared holy,that no promise of
essing was ever made for its observance,and no punishment for its
observance. That the apostles did not keep it nor commanded any
e else to do so. They declare that its observance is all a mistake
isted on the world by the Romish church,~~and they~~ which admit it.

In chapter 5 the writer says the S.D.A.fully expects an early
turn of Christ and that they shall actually greet Him in person
cause the condition of the world is exactly what He prophesied
would be when He was about to reappear. But as we have already
id, it seems that no amount of evidence to the contrary can cause
em to think differently. The author of this examination once lived
a Massachusetts town where a large group of these misguided folks
me for a campmeeting and worked up such a frenzy that many of them
ve away their belongings,except their night gowns. As night drew
ar they donned their robes,climbed to the roofs of houses and in
lence waited for the sky to open. What utter folly,what do they
ink the sky is? Like all such fanatic groups,they have ceased to
oclaim any special dates and now wait like the rest of us for His
ming to which we prefer to give a spiritual interpretation.

In chapter 6 the writer says that these people are profound students of prophecy and deal in their prophetic work with the great netic periods of time. Whatever that means. They say that the prophetic period mentioned in Daniel 8:14 ended in 1844 with cleansing of the sanctuary" which means that in that year Christ igh-priest in heaven, transferred His services from the holy place he most holyplace of the heavenly sanctuary. This, they say, means things, namely that Jesus has begun the work of investigating all s of sin on the books; and that since this is so, it amounts to oclamation of the nearness of His return. When His examination omplete the final judgment day will arrive and Jesus will come arth to hold that great assize. When it is finished He will take se who are found fit with Him to heaven for a thousand years. The rs will be completely destroyed.

These Advents consider themselves as divinely called, appointed, issioned and sent to all men with this last message of mercy.

They are, indeed, a peculiar people - They believe Christians now uld be satisfied with the diet which our first parents had in Garden of Eden. They say it did not include flesh nor stimulants. was a perfect diet given by a perfect God to a perfect man in a fect condition that he might live a perfect life. Therefore they not eat flesh and will not use anything that is injurious in any to the body. They do not admit to membership any user of alcohol tobacco and would cast out anyone found doing so. They even refuse and coffee because of their harmful drugs and because they believe that the body is the temple of God. They dress in simple fash- without gold and so-called precious stones. They do not mix with world except to help save it and they refrain from dancing, cards, ies and the theatre. hilarity and immodesty are also taboo. Yet y claim to enjoy far greater happiness in the purity of life and duct which prepares the soul for its heavenly associations.

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Appraisal of Seventh - Day Adventists Teaching

the human spirit

--- They think of God much as we do. But with some differences. He lives in a real,actual,material building.

us --- They think of Jesus much as we do,but He too is to prepare an actual place for those He loves.

rit --- This does not seem clear so far as we have read. It is said that ~~it~~ dies when man dies.

nity --- This is not clear either so far as we have read,but we may understand later.

and Sin --- Man is not immortal but may become so by accepting it as a gift from God. Man's sin,if not forgiven, will eventuate in his annihilation.

lemption --- The atonement of Jesus accomplished both at once, but we say salvation is an evolution.

urch --- They have many churches and they say they can build more because they do not build big ones.

istry --- They believe in a ministry similar to that of the early church,so they have Preachers ~~apostles,prophets~~,teachers etc.

ole --- They profess to be profound students of Bible prophecy and use the Bible almost wholly for that purpose.

craments --- They demand immersion in baptism and do not believe in child or infant baptism.

ristian Duty --- They will not use alcoholic liquors or tobacco and even refuse to use tea or coffee. They enjoy a vegetarian diet,simple clothing and pleasures. They observe the seventh day Sabbath and do not mix with the world except to help save it.

nsummation --- Death is a complete cessation of all activity,until resurrection day after which the Millennium will begin and continue on earth ~~in heaven~~ for a thousand years. Heaven is an actual,physical place and the Father's house is therefore a real building on earth. The wicked and Satan will be destroyed by fire. ← after that there will be a second resurrection when There is no eternal torment,but eternal death.

cond Coming --- In spite of many setbacks they still say they believe He is coming very soon for judgment and they will greet Him in person.

mnology ---

ganization ---

orld Mission --- They claim to believe that God has specially chosen them to help save the world.

5. SPIRITISM ---

Origin - In modern times the first movement in this direction took
ce in the United States in 1848 and was associated with the Fox
ters at Hydesville,N.Y. This pair of fakirs fooled the people with
s and knocks, but after a while the more intelligent listeners
covered their fraud,and the sisters confessed. In the meantime
practice had reached England at the same time that Hypnotism,now
l known,began to arouse scientific interest. It was soon joined b
Spiritualism but the quackery and pretense caused it to be negl-
ed for some years until Dr.Braid of Manchester reopened its study
h genuine hypnotic demonstrations. Back in 1844 a new phenomenon
d occurred in the form of the trance when Andrew Jackson Davis
scovered that he could go into one and become clairvoyant. He had
e friends copy his words while thus and found that they were quite
erent and after fifteen months produced a book which included a
ediction of a new planet which was soon found and named Neptune.
is strange practice was later absorbed by Spiritualism and the
mbination of clairvoyancy with hypnotism and spiritualism finally
tracted the attention of Dr.George Dexter and Judge Edmonds of New
rk who,after many experiments with mediums, published a book which
scribed their work and methods and even included alleged messages
om Swedenborg and Bacon and in spite of the impossibility of the
ing their respectability carried the publication through many edit-
ns. But the subject of secondary personality was not understood at
at time but later exposed their occult claims.

The most remarkable person,however,in this movement was William
ainton Moses who was a clergyman in the Church of England. In 1872
became interested in Spiritism and soon developed mediumistic
wers in himself. He finally left his parish and became editor of
eir chief paper "Light". He published two books,"Spirit Identity"
d "Spirit Teaching" which were widely read. He resented scientific
vestigation as a reflection on his honesty. After this there came
perfect inundation of questionable performances by traveling med-
ms who gave seances,materializations,slate-writing and various
her tricks. This has continued to our day in spite of painstaking
ientific investigations by many groups, and particularly by the
itish Society for Psychical Research which has shown that contact
ith the dead is not proved and that abnormal psychical conditions
the medium is the only satisfactory answer.

In 1900 Sir Arthur Conan Doyle joined the British Society and
egan to dip deep into occultism. He read much and carried out a ~~nu~~
umber of experiments with mediums. Then,after a quarter century,
e published,"The New Revelation" and joined the Spiritists. He
ithdrew from the Psychical Research Society on account of a scandal
ver some so-called psychic photographs by a William Hope. The writer
f this paper clearly remembers the occasion. In 1925 he became Hon.
resident of the International Spiritists Congress. At about this
ime a certain medium was arrested for fortune telling and the group
n London,Eng. was fined 800 pounds which action he strongly pro-
ested as the persecution of Spiritists and immediately started a
rive to have the fortune telling act modified,but he died the next
eek. On July 13,1930 a reunion of Spiritists was held in Royal
lbert Hall where an empty chair was left ~~of~~ for Mr.Doyle and a certain
lairvoyant asserted that she had seen him in the chair and that he
ad sent a personal message to his family through her. Can you beat it?

Since then numerous messages are claimed to have been received
him by various mediums,but they are doubted. Before he died he
e,"The History of Spiritualism",now a classic in two volumes.
by request wrote the booklet which is the basis of our paper.
title is "What does Spiritualism actually teach".

octrines - Sir Arthur says,"Religion cannot always stand still,
e referred to documents thousands of years old, God still des-
s to transmit through some chosen inspired medium,further light
uman destiny". We ask,is that the faith once for all delivered
he saints? According to Mr.Doyle this spiritualistic revelation
even superior to that brought by Jesus himself,in that we are now
e to break through the barrier of death and find that those who
dead have not changed except with respect to the speed of their
rations which have become much faster so that they are invisible
our eyes in the same way as ultra-violet and infra-red light is.
says these new high-speed bodies pass from this world into another
re they have definite duties,congenial work and pleasures that
natural to them. In this condition we can get into close touch
h them and also with the angels. From these direct communications
lood of spiritual knowledge has come into the world, and most of
se messages are as consistant and on as high a level as those of
Bible. He says this is true because this information is super-
mal and substantiated by a host of noted men of science. We say,
agree if he has in mind clairvoyancy,but if he is talking about
munication with the actual dead,he should be called a ~~liar~~. short name beginning w
admits that much of this evidence comes from mental phenomena,
lependent of the darkness of the seance room, and he adds that the
al argument for the truth of our new revelation is that it is the
st natural,reasonable and comforting interpretation of the facts
human life and destiny which has ever been put forward.

say we will not accept this peculiar nonsense because it is a
glomeration of misrepresentations. This man probably thought that
would live to write another worse thriller than Sherlock Holmes
which no spiritualistic material appeared. Yet Mr.Doyle goes on
declare that according to those who have died the experience of
ath is a sweet and pleasant feeling in which the etheric eyes
ow clearer as the physical ones grow dimmer.

At this point our author says,"We have now reached the stage
ere the freed spirit enters the new etheric life which is incon-
ivably beautiful in externals and the soul is supremely happy in
e presence of those he loves and all jarring elements are gone".
aven has been prepared by the loving hands of those who preceded
m. Everything is wonderful - its appointments,its flowers and ~~gard~~
rdens,its woods and streams all illuminated by a golden radiance.
on the new member is offered a choice of duties for which facil-
ies are provided: libraries for the scholar,laboratories for the
ientist,temples for worship,lecture rooms, centres of dramatic art
d musical education, and all are far beyond their development on
rth". For the children we read of delightful playing fields,simple
nocent pleasures,and education under the most charming conditions.
e religious sense is awakened and stimulated by the glories which
rround the released soul. It is not a life of monotony not even
devotion and worship". "Such is the picture of the future life we
ave received from the other side". "This,however,is not final,noth-
ng is final. We continue to grow". We say, what utter naive nonsense.

" So much for the fate of the deserving people who are really vast majority of the human race. All this talk about our being rally wicked is perfect nonsense. Most people have made such a e fight against the odds of life that they merit no kind of shment but rather reward and compensation. Of course evil must ealt with - such as cruelty, whether mental or physical; bigotry, denies a place to unorthodox religion, and pride that sets a on above his fellows." "Those who have read the posthumous writ- of Oscar Wilde and Jack London will realize the feelings of e who have become conscious of being earth-bound."

The present Spirit[illegible]listic philosophy is not drawn from witnesses dead, nor from chronicles which can never be translated without ous errors, but they are messages of a higher order of morality that of ancient tribes, and fortified by supernatural signs h show their other world origin". "I have had more beautiful sages from my own spirit-guide Pheneas than from any other source". a man is kindly and gentle there is no fear for him beyond". ee great things have happened in the history of the human race:-

he idea of a single God in the Universe.

The Christian code of morals taught by Jesus.

The breaking of the veil that separates our sphere from the next".

irit[illegible]lism is a Science, a Philosophy and a Religion".

As we have already said, if he is talking about clairvoyancy agree, but if he is discussing information from beyond death we y strongly disagree and disbelieve.

The old saying," Dead men tell no tales." still stands.

7 ~~6~~. THEOSOPHY --- This is deep water, ~~swim-hard~~. We venture now where angels fear to ~~tread~~. swim.

Origin - Introductory - Present Theosophy is an illconceived ipt to relate ancient Brahmanic metaphysics to modern life. It pseudo-philosophy that cannot be called a religion. As early as B.C. the Iranian people, one of the Aryan tribes which includes Hindus, Persians, Greeks, Latins, Celts, Teutons, and Slavs, were led ieir priestly wise-men along what they called the Aryan Path i consisted of mystical teachings about the Brahma or Supreme it and the life of man.

ts ancient notions - The word Theosophy means wisdom about God the laws of nature and human nature. Such wisdom is not attained nyone but is revealed to those who follow and closely observe duties suggested in their books known as the Vedas. About 600 B.C. ain of their wise-men produced a philosophical compromise to the very rigid Vedic requirements. This, in Sanskrit, was called ishads which means to sit down and discuss. Some 250 of these lets were finally in use and their keynote was "Thou art Thou," is. Thou art identical with the Supreme One or World Soul. The n body is supposed to be pervaded by breaths called atmans that from the original Atman or Ego. All things are merely emanations t, therefore things can exist only while the Universal Ego is sent. (We think this is odd since they claim that the Ego is always sent everywhere, like God.) They say existence has seven states: - iental, mineral, vegetable, animal, human, universal, and divine, and a person may pass into any~~one~~ one of these during the process reincarnation and finally reach Nirvana, which, of course, is Divine . Hell is merely a depraved condition of man while he is here re death ends the existence of the body, but the soul goes on to ther reincarnations.

Its American Section - There are sections or branches in almost ry country. It is called, "The Theosophical Movement." The American nch is called, "The Theosophical Society" and was founded in New k City by Helena Petrovna Blavatsky a Russian traveler in 1875. 1895 a prominent Russian lawyer exposed her as an imposter who imed miraculous powers. Her pretenses were also exposed by the iety for Psychical Research but she kept right on hoodwinking gullibles with her curious books with such ~~manes~~ titles as "Isis Unveiled", s, you remember was the goddess of enchantment in Egypt and Rome. also wrote, "The Master-Key to the Mysteries of Ancient and Modern ence" and later, "The Secret Doctrine" which is now the chief text k of the Society. In it she sets down three fundamental proposit- is:- (1). There is an omnipotent, eternal, boundless, and immutable nciple which is beyond the power of human discussion, but may re- l itself to those who become adepts. Any knowledge thus obtained esoteric, that is, subjective.

The universe is the physical counterpart of the Eternal Spirit, is it and It is he - Thus their pantheistic idea unfolded. This iverse is a boundless theatre where all things come and go accord- g to the law of periodicity or cycles. Reincarnation is one of the ocesses, and this peculiar effect can be discovered almost everywhere. There is identity of nature in all souls with the Supreme or Essence. the One Unknown Root and this identity in the end is Absorption. The law of evolution is accepted but only as a half- law, the other lf is involution. Spirit and matter are two aspects of the Unknown ot. The spirit involves into matter and matter evolves into spirit. om this Root arise the seven root-races with seven sub-races, and are now in the fifth sub-race of the fifth Root-race.

2. Theosophy

ll human beings must climb through seven Rounds or periods which spiritual at first but become darker in the downward cycle. This i is now in the darkest Round and these Rounds are of unknown tion. Man is composed of seven principles which function in a er and in a lower nature. The lower is his personality which is fold:- One quarter of his physical body is visible and three ters invisible or astral. On this astral body are molded the phy- l atoms to make a material body but without form and held toget- by the astral body and moved to action by the fire of desire. higher nature is threefold - mind,soul and spirit. The astral slowly disintegrates and the life spark reunites with the Ego. re forms a new body but this also becoms exhausted in time and es behind certain elements called SEEDS from which the soul soon s a new personality. Before its return to earth it enjoys a per- of rest,not Nirvana, proportionate to the good deeds done in life. this ends the new personality decends to the earth and is reborn. law that controlls all this is called KARMA which ballances the rn life with the deeds of the former existence for the purpose mprovement toward Nirvana which is absorption. These rebirths continue just as long as it takes the soul to become wise enough ease all sinful thoughts,words and deeds.

ere is a recent pronouncement about Reincarnation. It says "this he only answer to the problems of life and in it and Karma is force that will make men pursue,in fact,the ethics they have in ory. It is the aim of the old philosophy to restore this doctrine whatever religion has lost it; and hence we call it the lost chord hristianity. This old truth solves the riddle and paints God and ure in harmonious colors. Unless we deny the immortality of man the existence of soul there is no sound argument against the doc- trine of preexistence and rebirth save such as rest on the dictum the Church that each soul is a new creation. The soul's immort- ty,believed in by the mass of humanity, demands embodiment here elsewhere, and to be embodied means reincarnation. It is needful t each soul should have all possible experience, and one life not give this even under the best conditions. The aim for present is his initiation into complete knowledge. It is a magnificent spect:it makes of man a god." Here are some quotations they use:-

thew chapter XI and XVII In both Jesus approves reincarnation. re John the Bap.and Elias also Moses and Elias.

ans chapter IX where they point out that Jacob and Esau were alive before they were born.

overbs chapter VIII :22 Which refers to Wisdom, but they make it refer to Solomon.

velation chapter III : 12 Which stresses the safety of the saved but they make it uphold their doctrine in that it means that they will not have to endure another reincarnation.

ke all the rest,they are a group of misinterpreters of Scripture.

This is where most of the trouble arises with these sects.

DECLARATION
OF
THE UNITED LODGE OF THEOSOPHISTS
51, Esplanade Road, Bombay.

The policy of this Lodge is independent devotion to the cause of Theosophy, without professing attachment to any Theosophical organization. It is loyal to the great Founders of the Theosophical Movement, but does not concern itself with dissensions or differences of individual opinion.

The work it has on hand and the end it keeps in view are too absorbing and too lofty to leave it the time or inclination to take part in side issues. That work and that end is the dissemination of the Fundamental Principles of the philosophy of Theosophy, and the exemplification in practice of those principles, through a truer realization of the SELF ; a profounder conviction of Universal Brotherhood.

It holds that the unassailable *Basis for Union* among Theosophists, wherever and however situated, is "*similarity of aim, purpose and teaching,*" and therefore has neither Constitution, By-laws nor Officers, the sole bond between its Associates being that *basis.* And it aims to disseminate this idea among Theosophists in the furtherance of Unity.

It regards as Theosophists all who are engaged in the true service of Humanity, without distinction of race, creed, sex, condition or organization, and

It welcomes to its association all those who are in accord with its declared purposes and who desire to fit themselves, by study and otherwise, to be the better able to help and teach others.

"*The true Theosophist belongs to no cult or sect, yet belongs to each and all.*"

3. Appraisal of Theosophical Teachings

od --- An all-creating,everywhere existing,eternal Spirit who stirred his own being to create everything out of Himself, even the human race which he will finally reabsorb. "He is it and it is He" is a fundamental concept, Pantheism.

s --- He is accepted as one of the great Mahatmas(Great Souls) but he is not thought of as a Saviour.

it --- There is but one,that is the eternal Creator. Man's spirit is an emanation from it.

ity --- They do not think of such a person,because their doctrine states "One is all and All is one".

and Sin --- Man is an emanation of the Eternal Spirit and although he sins, he does not need repentance since that is only a wrong condition of mind which if forgotten will prove to amount to nothing.

mption --- Man must redeem himself through many incarnations. He caused his own sin and must overcome it by much striving and profound thought. No Mahatma has ever died to save his followers.

ch --- They have no church,only groups of dupes,all in a hall.

stry --- The Mahatmas and Adepts are only observers of human action,never man's helpers. They may learn how to control the forces of nature so that some of them can perform miracles. They have mastered the mysteries of sound and color through which the elemental things behind the veil of matter can be communicated with, and thus can tell why the rain falls and what it falls for; whether the earth is hollow or not,what makes the wind blow and light shine. If one of these Mahatmas can make a solid object move without contact,it is because he understands the two laws ~~of~~ attraction and repulsion; if he can precipitate the carbon out of the air and have it form sentences on a piece of paper it is because he knows higher occult chemistry. What wonderful IFs.

ite--- Their sacred books are the Vedas which possess divine wisdom; the Upanishads which contain simpler discussions: the 36 Puranas which tell of prehistoric cosmic conditions, and the Tantras contained in 400,000 verses.

Saraments --- They appear to have none of these so far as we have seen.

Chistian Duty --- Kindness seems to be important and the desire for universal brotherhood is much talked about but they still maintain certain class distinctions.

summation --- They have brief rest periods between incarnations and at last the great All reabsorbs the it.Nirvana.

ond Coming --- They have as many comings as are necessary to reach complete knowledge and the total extinction.

nology --- There are over a 1,000 hymns of the Rig Veda and reams of semiphilosophico-metaphysico-magical poetry.

anization ---Each is separate from all others,the only basis of union is"similarity of aim,purpose and teaching".

ld Mission ---

Attached is a booklet which is as clear as water mixed with earth.

UNITY SCHOOL OF CHRISTIANITY ---

igin - This school was organized about 1890 by Charles and Fillmore after they had been healed, prospered and blessed their literal application of Christian principles in their res and daily affairs. The headquarters and main school are ansas City Missouri. It is an educational, nonsectarian, religinstitution devoted to proving that the teaching of Jesus is a cal way of life. It is a school rather than a church that claim to help anyone, regardless of his church affiliation, to find , peace, joy and prosperity through his daily practice of Christinciples. Today it mails millions of books and periodicals onth, and maintains the Silent Unity Group of 100 consecrated s who render a twenty-four-hour-a-day prayer service in respo calls for spiritual help. It has received as many as 600,000 in a single year and none is too small for its attention.

ctrines - They claim to believe many strange things.

garding God - They conceive of the Divine Intelligence as present in every atom of man and matter. That God is both ine and feminine and they address Him as Almighty Father- . That the God-mind lives, moves and has its being in man to tent of his consciousness.

garding Jesus - They hold that the Logos mentioned in John's is the God idea or Christ that produced Jesus the perfect man. say that Jesus is alive and in the world today pouring His ab- life into the race stream as a vitalizing energy that, when ed, in faith, purifies the life flow in our bodies and makes une to all disease thoughts and disease germs.

egarding the Holy Spirit - They believe that He baptizes the se and man with the thoughts of God, and perpetually estab- the Divine law in all manifestations. They believe in twelve oles which are the twelve powers of man going forth into mind ody with power and authority to teach, to preach, to heal and y save men and the world from sin, sickness and death.

egarding the Trinity - Their idea here is not easy to under-. We shall withhold comment.

egarding Man and Sin - Conscious man is the throne of the God-when he dies it is withdrawn. They believe that the authority ominion given to man was over his own thoughts, feelings and ons, and that man's words do accomplish that whereto they are We think it is God's word that can do that. They say that man, gh his indulgence in sense consciousness fell into the belief e reality of matter. They hold that through conscious union Jesus man can transform his body and make it perpetually healthy herefore immortal and that eternal life cannot be attained in ther way.

egarding Redemption - The latter part of the above paragraph is nswer here.

egarding Church- They claim to operate schools not churches.

egarding Ministry - There is no ministry as we know it, but eat many leaders who travel about and teach their doctrines.

egarding Bible - They believe that the Scriptures are the testmals of men who have, in a measure, understood the Divine Logos hat their writings should not be taken as final. An echo from Eddy, Latter-Day Saints, and Spiritualism.

Regarding Sacraments - They seem to have none.

Regarding Christian Duty - The kingdom of heaven is within and man can establish the law and order of the Divine Mind here on h.

2. Unity

Regarding Consummation - They say that death is annulled by rth of the same spirit and soul in another body here on earth, hat the repeated incarnations of man are a merciful provision d so that all may have opportunity to attain immortality. also believe in the final resurrection of the body, through Chrt st, and that we free our minds and resurrect our bodies by true ghts and words, and that this resurrection is being carried for- daily and will ultimately cause final purification from all ly errors. Through this process we shall be raised to the ciousness of continuous health and eternal life NOW.

Regarding Second Coming - This is now taking place.

Regarding Hymnology -

Regarding Organization -

Regarding World Mission -

his is an eclectic mysticism, a mixture of Brahaminism, heosophy and Christian Science.

SOME DISTINCT DIFFERENCES
From the United Church faith.

— Concerning God —

d is the source of all things,they rise out of Him as their ground. His kingdom ll be set up on Earth by Jesus for A thousand years.

d is the mind of man. Man is God's idea,therefore sinless and everlasting. God the great I AM; The all-wise,the all-knowing,the all-loving eternal Spirit.

d is a Unity not a Trinity,we prefer to call Him Jehovah. His kingdom is to be t up on Earth for a thousand years with headquarters at Jerusalem.

the Latter-day Saints God is thought of much as the people of the United urch think of Him. They do not believe that God evolves as do the Mormans of ah, who say that God was once like man.

od is a real physical Being and His heaven is an actual material place. In the re-christian dispensation it was proper to observe the Seventh day,but not now.

piritism declares that God has given mankind a New Revelation in the form of ommunication with the dead. Sir Arthur Conan Doyle has written much about it ut his material picture of heaven is too naive for a thinking person.

od is the One Unknown Root who stirred his own being to produce all things. his is much like C. above. Theosophy says,"He is it and it is He" which leads o Pantheism, Absorption and Nirvana.

od is Intelligence,which is present in every atom of both man and matter,and s both Father and Mother of all things.

— Regarding Christ —

hrist is the Second Adam who will finally destroy all ~~nations~~ governments and ule all nations. Like JW.above He will rule for 1000 years at Jerusalem.

hrist is not God but is the ideal truth which saves us from sin,sickness and eath. Christ is the divine manifestation of God which comes to the flesh to estroy incarnate error.

Christ was the first created being and,as such,caused the rest of creation. Jesus is one with God in purpose but not in person.

Christ will come for the first resurrection and judgment and take His own to heaven for a thousand years. He will then return a third time for final judgment.

Christ will set up His kingdom on earth for a thousand years. The place is now in preparation and,like several others,they think He is coming soon.

Christ is God's Son, but they give Him no office. His work has been superseded by the new revelation mentioned above.

Christ is a great teacher but not a saviour. We prefer to call him a Mahatma.

Christ is not a person but only an idea of God which is here now pouring his abundant life into our race stream as an energy which,when accepted by faith, purifies the life flow in our bodies and immunizes us from disease thoughts.

— The Holy Spirit —

he Spirit of God is effluent from His person and fills all space. The Holy pirit is the same but is used only in special cases.

pirit, with a capital, means Deity. There are no others. Finite spirits, with a mall s, do not exist.

heir ideas regarding the Holy Spirit are similar to those held by the U.Ch.

heir ideas regarding the Holy Spirit are similar to those held by the U.Ch.

heir ideas regarding the Holy Spirit are similar to those held by the U.Ch. ut the human spirit dies when man dies.

piritists make no mention of the Holy Spirit but they say that the human spirit oes not die and is therefore fully alive in the spirit realm.

here is no Holy Spirit but God, and He is the only ONE. The human spirit is n emanation from Him.

he Holy Spirit baptizes the earth and man with the thoughts of God. Man is ossessed by twelve spirits called disciples through which he is empowered to reach, heal and save men from sickness, sin and death.

– The Trinity –

ince Christ is a great teacher and not a deity He cannot be one of a Trinity. ince the Holy Spirit is merely a power of God and not a person it cannot be ne of a Trinity, therefore there is no Trinity.

hristian Science makes no reference to the matter.

he Trinity idea is not found in the most ancient manuscripts but was forced into he later ones by the Roman Catholic hierarchy.

he Latter-day Saints do not discuss this subject with sufficient clarity.

heir ideas regarding the Holy Trinity are similar to those held by the U.Ch.

piritists make no mention of the Trinity.

heosophists cannot accept the idea of a Trinity because their basic doctrine s expressed in the formula, "One is all, and all is One".

e have not found any clear statement on this doctrine.

- Re Man and Sin -

an is mortal, to say he is immortal is to speak falsely. His life is just the ame as any other animal. There is no Devil, but merely a spirit of disobedience. f a man sins he must seek forgiveness. If he does not he will suffer annihil-tion at last.

s we have already seen, these pseudo-scientists claim that man is the idea of od, simply a reflection of Deity, sinless and everlasting. He has no separate ind or power. The thing that sins is not the Soul, capital s, but material sense.

Hell is nothing but the grave, there is neither burning nor torment. The punishment of the wicked is everlasting death, which is annihilation.

Their ideas re Man and Sin are similar to those held by the U.Ch.

lan is mortal but may obtain immortality by accepting it from God.Man's sin, f not forgiven,brings annihilation finally.

.ll this talk about natural wickedness is sheer nonsense. Evil is here and we ave to deal with it in our own way.

lan is an emanation from God and although he sins he does not need to repent ecause the idea is a wrong attitude of mind which,if forgotten,will amount to othing.

onscious man is the throne of the God mind. Through union with Christ man can ake his body perpetually healthy and therefore immortal. When man dies the od mind is withdrawn.

- Redemption -

o gain redemption man must accept the Scriptures with Christadelphian changes. e must be immersed in baptism that he may be forgiven. Faith in this cleansing acrament turns a sinner into a saint.

ccording to Christian Science man's redemption is largely dependent upon his cquaintance with its pseudo-philosophy. Man is found in two different conditions: n one he is mortal and a child of Satan; in the other he is immortal and the ure image of God. He can rise out of the former into the latter by a study of C.S. ntil he disbelieves in the error of sin.

heir ideas on this subject are similar to those held by the U.Ch.

heir ideas on this subject are similar to those held by the U.Ch.

oth the redemption and the salvation of man was accomplished in Christ's one act f vicarious sacrifice on the cross.

ince man is not inherently wicked,he needs no redemption. He can grow out of is present state by a careful study of Spiritism.

he redemption of each man can be accomplished only by himself in and through any reincarnations on the way to Nirvana.

uman redemption may be achieved through conscious union with Christ.

- The Church -

tc. Most of these groups meet in halls. One or two have churches. Some have egular ministers,others have no preachers at all, only lay leaders.

- The Ministry -

hey have no paid preachers,only lay lecturers who are very dogmatic. They take nusual delight in twisting Scripture to favor their false interpretations.

n 1894 they dispensed with preachers and employ only lay readers,mostly women. hey have many practitioners who give treatments and ask large fees.

hey have a Theocratic school where they develop their ministers. They also have any lay members called Messengers,Pioneers,Witnesses and Evangelists.

hey have Bishops,Ministers,Evangelists and Missionaries much as we do, but they still cling to the Book of Mormon with its many nonsensical ideas.

They have ministers paid from a pool to which all contribute from tithes. They do not mix with the world except in their efforts to save people.

They have lecturers,mostly women who ,in many cases,claim to be clairvoyants.

The Mahatmas do not preach but only observe human activities. The Adepts and Leaders claim to know many hidden processes in nature but most of them do not know the scientific reason for the phenomena.

They have no regular ministry but a great many leaders go from place to place trying to teach their peculiar ideas.

- The Bible -

They accept the Bible as in the King James version and will not agree to any other nor any suggested critical changes.

To them the Bible is not clear and therefore must have Mrs.Eddy's ,"Science and Health" to properly explain its many difficulties.

They think of the Bible much as we do but add several fanciful ideas such as we have noticed above.

They claim the Bible is not yet complete and cannot be so until the revelations of their prophets have been included. They say the Book of Mormon is superior to the Bible in its moral teaching.

They claim to be great students of prophecy and thus make much of Daniel and Revelation and try to plan God's plan for the world.

They say the Bible is not inspired and that those who say it is are speaking falsely but it does possess three great propositions,namely: The discovery that God is One; The promulgation of the Moral Code of Jesus; and the New Revelation that we may converse with the dead, who are alive.

To them the Bible is only one of the sacred books of the world. They claim that their Vedas, Upanishads, Puranas and Tantras are just as important.

To them the Scriptures are testimonials of men who understood but little and must not be considered as final. The canon of Scripture cannot be closed.

- The Consummation -

Death is a state of nonexistence until the resurrection and judgment determines man's destiny. The dead will rise in their natural bodies, judgment will be pronounced only on the responsible class,the rest die like the other animals. Then Christ's followers will become for the first time,Immortal.

Death is not discussed because it is merely a dream. Sinners are called mortals and can never attain immortality.

The earthly kingdom of God began after the first world war. The forces of evil and antichrist are now preparing for the Battle of Armageddon. After that battle the earth is to become a paradise for God's people who are of two distinct groups: one,numbering 144,000,will be taken to heaven; the other,whose number is not stated,will be left on earth for all eternity.

The dead in Christ will rise first and in their physical bodies, the others will remain in their graves until after the thousand years are passed,then they will be called to judgment.

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eath is a complete cessation of all activity until the resurrection,then the dgment and a thousand years in heaven which is a literal,actual,physical place. he wicked and Satan will be destroyed by fire,but there is no such thing as ernal torment,but only eternal death.

death the released spirit enters the new etheric life which is inconceivably eautiful. The new comer will be offered his choice of occupation.

he dead enjoy brief rest periods between incarnations and at last they are bsorbed by the All - Nirvana.

eath is annuled by rebirth of the same soul and spirit in the new body, thus ll may reach immortality. The second coming of Christ is now taking place.

END

A Forestry Contest

1. What tree shall we wear to keep us warm?
2. Which do ships prefer in storm?
3. Which shows what lovelorn maidens do?
4. Which indicates triumph?
5. Which sings a song?
6. Which is not destroyed by fire?
7. Which do bad boys dislike?
8. Which is a sweet young lady?
9. Which is a man well groomed?
10. Which is a playground for children?
11. Which makes good summer wear and winter fuel?
12. Which is never seen alone?
13. Which is part of a girl's dress, and part of her hair?
14. Which is the most cheerful?
15. Which holds office in church?
16. Which is a county in Ireland?
17. Which is found on Calendars?
18. Which is an oft-told joke?
19. Which would play a kissing game?
20. Which is always straight up?

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SERMONS

XVIII

SOME SERMON SUBJECTS

Preached bythe Author

CHRIST'S FIRST CONTACTS:-
Jesus and the Saints
Jesus and the Shepherds
Jesus and the Sages
Jesus and the Scribes
Jesus and the Spirits
Jesus and the Sinners

A MIRACLE SERIES
Miracles in the Physical World
Miracles in the Disease Realm
Miracles in the Realm of Mind
Miracles in the Realm of Sin
Miracles in the Event of Death
Miracles in the Realm of Spirit

A SUMMER SERIES
Hot and Cold
Heads and Tails
Man and Wife
Odds and Ends
Black and White
Ins and Outs
Old and Young
Ups and Downs
Rich and Poor
Dos and Don'ts

A COMPOSITE OF JESUS
His Deity
His Love
His Mind
His Claims
His Gospel
His Power
His Insight
His Wisdom
His Courage
His Mission
His Sympathy
His Magnetism
His Imperialism
His Authority
His Veracity
His Necessity
His Atonement
His Humanity

A SERMON SERIES BY
Jesus Christ
Paul the Apostle
James the Martyr
Stephen the Martyr
Peter the Leader
John the Baptist

THE GREATEST EVER SERIES
The Greatest Life ever lived
The Greatest prize ever won
The Greatest banquet ever spread
The Greatest battle ever fought
The Greatest invitation ever given
The Greatest sin ever committed
The Greatest adventure ever made
The Greatest empire ever built

THE CHRISTIAN SERIES
Three kinds of Christians,which RU?
How to be a true Christian hero
The Christian in the dark world
The Christian's deathless courage
The Christian and his stewardship
The Christian's trials and triumphs
The Christian's remarkable name
His most important field of labor
His final victory and its glory
What legacy will he leave the world?

AN OCCASIONAL SERIES
Science and Irreligion
What we know about God
Freedom through truth
Faith or Reason,Which?
Rejecting Christ
The fallacies of war
The Postulates of peace
The Dynamic of the Gospel
Waking the Dead
The value of Evangelism
Are we immortal yet?
The mysteries of the kingdom
Is the Old Testament a dead book?
HIS DOMINION

A MODERN SCIENCE SERIES
Through a glass darkly
The plumbline
Radio and Television
The RAD family
The microscope
The hour-glass
The Compass
The clock
The telescope
Telephone and telegraph
The airplane
The pendulum
The gyroscope
The camera
The prism
The magnet

MY FIRST SERMON   MANY CHALK TALKS   SEVERAL SERMONS FROM THE GREEK TEXT

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THESES

XIX

I

THE LORD'S PRAYER

To the Editor of the London Free Press -- In your Saturday issue my attention was drawn to an article about the Lord's Prayer which stressed the desirability of having its wording changed so that all who have to repeat it may use the same phraseology. This is most laudable and happens to be a subject on which I have worked for some time. May I offer some suggestions?

My present attempt is based upon a careful study of the Greek and several translations and revisions of the highest quality.

FIRST - Let me submit a free literal translation of my own from the popular Greek of Jesus' day as used in Matthew 6:9-13. Here it is.

"Father of us who in the heavens;
Hallowed the name of you,
Come the kingdom of you,
Be done the will of you,
As in heaven,so on earth;
The bread of us,the daily,
Give to us each day;
And forgive to us the sins of us
As also we have forgiven the offenders of us,
And not lead us into testing
But deliver us from the evil one."

The Subscription -- For thine is the kingdom,~~the power and the glory~~,
and the power and the glory, for ever, Amen. is a later addition.

SECOND -- From the above we see that to obtain a satisfactory reading it is necessary for us to re-group the words and add some verbs which are not expressed but are easily understood. By so doing we arrive at the following order for a correct modern translation which is as follows:--

"Our Father who art in the Universe;
Hallowed be thy name,
Thy kingdom come,
Thy will be done,
On earth as it is in heaven;
Give us each day our daily bread,
And forgive our sins as we have
Forgiven all who have offended us;
And lead us not into testing,
But deliver us from the evil one.

For thine is the kingdom,the power and the glory
for ever, Amen."

THIRD --- An explanation of the changes made,and underlined.

I have put the word universe in place of the heavens because the latter is plural and includes heaven which is not the entire universe. The word each is used because the Greek contains the idea of continued action. This does not. We should use the word sins because our offenses against God are sins,not debts. The word as is better than for because it is a measure,not a reason. Offense is used because man cannot forgive sins. Testing is used because it is the proper translation and no moral ~~laxity~~ element is suggested as in temptation. The evil one is used because it is the proper translation of the Greek. We should not double ~~this~~ the word ever because we cannot increase the duration of for ever.

W.G.Colgrove, Oct.15,52.

II

THE BIBLE VERSUS BOOZE

Many people seem to be confused regarding the position of the Bible on the drink evil. Some apparently think it favors the use of strong drink and will try to defend their indulgence by reference to some passages of scripture. It is too bad that those who know most about the use of liquor, know least about the Bible, and vice versa.

The best way to understand the matter is to carefully define the terms, and to do this, one should study the various word forms that were used, and their context. In the book "Winning the Fight Against Drink," the author tells us that the Hebrews used at least 11 different words for wine in its various forms. For our purpose we need to consider only three of them.

In the Old Testament the generic term Yayin refers to wine in any condition whether fresh or fermented, and appears 140 times. When these writers wished to distinguish between fresh and fermented wine, they used two different words: Tirosh for fresh and Shekar for fermented wine. A careful survey of the passages where they occur, discloses that Tirosh always enjoys the divine approval, is always associated with wheat, corn and oil as one of the special blessings of God, is never the cause of drunkenness, is never prohibited, is never condemned but is frequently commended as a food. It is found in the O.T. 38 times.

Shekar, on the other hand, is always under divine disapproval, is always associated with vice and crime, is the cause of drunkenness, debauchery, suffering and waste, is always prohibitive and condemned but never commended except as medicine. It occurs 43 times and is usually rendered "strong drink."

In the New Testament the place of Yayin was taken by Oinos the Greek term for wine in general, and since there was no single Greek word for fresh wine the translators used Oinos for Tirosh. This has troubled many readers who did not bother to look deeper to find that the context would reveal the condition of the wine. Most careful readers of the Greek would also find that in several places the proper forms of Methuo meaning, I am drunk, were used to make it clear. Oinos was never made the equivalent of Shekar.

Instead, this word was rendered by the various forms of Methuo or was taken over bodily in the transliteration Sikera. This surely shows the debauched character of Shekar and Methuo and brands them as always indicating fermented wine, while the meaning of Oinos can be easily determined from its context. The Bible is therefore forever freed from complicity with intoxicating drink and the evils of the liquor traffic.

Let us consider the following passages:

Matt. 9: 17—New wine in new skins, (Oinos) an illustration only. Jesus had just answered a question about the disciples fasting. This was fresh because new.

Mark 15: 23—At the crucifixion they offered Jesus wine (Oinos). It must have been fresh to allay thirst. He said, "I thirst." We all know that alcohol increases thirst.

Luke 1: 15—It was said that John the Baptist should not drink wine (Oinos) nor strong drink (Sikera). The former is generic, the latter is made from fruits but not grapes. Oinos must refer to fresh juice to be thus contrasted with Sikera.

Luke 7:33 — John came not drinking wine (Oinos) of any kind. This is its generic sense and thus fulfilled the above statement.

Luke 10: 34—The Good Samaritan poured in oil and wine (Oinos). This would naturally be fresh to cleanse the wounds, but if it was fermented, it was used in a medicinal way and therefore was permissable.

John 2: 3—Jesus changed water into wine (Oinos). It must have been fresh because we are told in verse 11, he thus manifested His glory. Surely no one would suggest anything else.

Acts 2: 13—These men are full of new wine (Gleukous) sweet. This was merely a rough joke. Anyway it was sweet fresh juice.

Rom. 14: 21 — It is not good to drink wine that offends (Oinos). This is generic, one can become offensive with either kind. This is much needed advice.

Eph. 5: 18—Be not drunk with wine (Oinos) wherein is excess. This is also the generic term. See Rom. 14: 21 above.

Tim. 5: 23—Take a little wine (Oinos) for your stomach's sake. This, of course, is medicinal and may be either fresh or fermented. Note the word little.

W. G. COLGROVE

London, May 1946.

IS THE BIBLE WRONG? III

Editor, Free Press: In your issue of August 17 there appeared a report of an address by Dr. Whitely, of Oxford University, entitled, "Universe is still developing" Bible held wrong on creation. To some parts of which I wish to take exception in a kindly spirit.

First, I notice that the title is divided in an unusual way--one half is a quotation, the other without marks which makes one think that someone who wished to slam the Bible added it. If so it is reprehensible.

Second, the first sentence of the article is also reprehensible because the writer or the reporter added a false word when he wrote, "The Bible is ALL wrong about creation" because that is not so as I shall show later.

Third, the real burden of the address was the doctor's call for a new translation of the Bible, particularly of its 'picture language', which he thinks few men can understand, but does he not know that a half-dozen new translations appeared in the forties--one a literal translation from the Greek and two in good English phraseology.

Fourth, it seems as though Dr. Whiteley thought he was discussing something quite new in science, but our high school students have been hearing such things for a decade or more. The Bible does NOT say that the entire creation occurred in "a single flash nor a series of flashes" but during six periods of unknown duration. There is no great disharmony between the Bible account and the most recent findings of science.

Fifth, when one examines carefully the first chapters of Genesis he finds that creation as recorded there had apparently three stages-- The first may be called the Primal Creation in which, as the result of divine volition, all the elements swarmed into being and were ready for further creative development. The second may be called the Organic Creation during which the Creator willed to utilize this material. It was then that heterogeneity gradually became homogeneity in the formation of stars and planets and all other generic objects from which myriads of species could later be evolved. The third and last stage may be called the Special Creation when it is said God decided to make man in His own image. Of course everyone knows that this does not refer to appearance but only to attributes. As time passed the trees were given unconscious life, the lower animals were granted conscious life, while man received self-conscious life together with personality, moral and spiritual faculties and authority over the non-human creation.

Having discussed the possible METHOD of creation let us now consider some recent scientific evidence about the TIME element involved.

During the past decade some of the foremost scienti~~fic~~sts of this western hemisphere have been working toward a solution of this problem and have recently given their findings to the press. Their names ~~may be had on request.~~

Drs.Alpher and Herman of Johns Hopkins University; Dr. Gamow of George Wa Washington University; Drs. Bok and Whipple of Harvard University; Dr. Spitzer of Princeton University; and Drs.Humason and Hubble of Mounts Wilson and Palom

First, they found that the tiny impulses of radiation from radium-bearing rocks could be counted and were regular and continual and that the regularity was a measure of their disintegration which requires a long series of steps which extend over a period of from 5 to 6 billion years. Then by careful examination they found that only a little over one third of this element had completed the series of changes and become a form of lead. This showed that the rocks and the earth were about two billion years old.

Second, they studied the structure of many Spiral nebulae and found that our particular Spiral,the Milky Way,is about 100,000 light years across, is composed of about 100 billion stars,many of which are in vast clusters, and that the whole thing is rotating at 163 miles per second. They also figured that this high speed would pull all clusters apart in only fifteen rotations, but there are still many clusters undisturbed so that our Spiral has not rotated more than half that often and is therefore about 2 billion years old,like the above.

Third, they found that by examining many of these Spirals,most of them appear to be receding from our position at speeds that increase in proportion to their distance from us. It was thus possible to show that these nebulae had begun to leave our area about 2 billion years ago.

Fourth, these men therefore feel that in this threefold answer they have given us a scientific background for Creation as expressed in the Bible and for the sequence of events mentioned there. The Doctor,therefore said nothing new and made no case against the Bible record,

W.G.Colgrove, London,Ont. Aug.1950.

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God's Message Found in Stars, Pontiff Says

By PAUL HOFMANN

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Rome, May 20.—Pope Pius today urged some of the world's top astronomers to read in the stars a message written by God. Among the pontiff's audience were noted scientists from Mount Wilson, Palomar and other U.S. observatories.

Scientific truth, the Pope said, becomes fallacy where it "belives it to be sufficient to explain everything without linking itself to other truths and, above all, to the subsisting truth that is a living and freely creative being."

The efforts of scientists, the Pope said, however disinterested and courageouns they may be, remain senseless if they fail to see beyond purely intellectual ends the basic problem of conscience—"the decisive choice between good and evil." Scholars must live for spiritual values, for justice and charity, the pontiff declared.

Charity, he explained, "is not simple philanthropy or sentiment of human solidarity but originates from a divine source, from the revelation of Jesus Christ."

Astronomy may hold in its hands the keys "that will open closed doors," the Pope said.

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The Church

and

Modern Miracles.

W. G. Colgrove.

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Introductory

The antiquity of wonder-working.
The objective possibility of miracles.
Their credibility and evidential value.

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The Church's commission
The Church's duty
The Church's equipment
The sublime possibilities

Anticipatory

In choosing this rather peculiar subject for a thesis we re conscious of the fact that almost nothing had been previously itten upon it. We found some encouragement, nevertheless, in the her fact that many attempts have been and are being made to awaken the long dormant art of physical and psychical healing. his thesis, if it proves worthy of the name, is an attempt to briefly iscuss the matter of so-called miraculous healing in both Apostolic d post-Apostolic times, and to show that although there are nany unbridgable breaks in the line of Apostolic Succession, there s still the Apostolic power, at least in some degree, to perform various iracles. We feel assured that the day of some kinds of miracles s not passed and that the Evangelical Church is failing in this very ork while at the same time she is giving place to parasitic cults nd isms which climb like poisonous ivy around this pillar of her difice and, sapping her life, flourish on her own decay.

The dearth of material on this very important branch of the relation of the work of Christ and the Apostles to the present age ught to be an incentive to competent scholars to compose and compile some weighty and worthy tomes upon it.

Introductory

The mists of antiquity hang over the geneses of thaumaturgy
d magic so that it is impossible to obtain a clear conception of the
mitive practices. It is evident, however, that all people have had their
acteristic medicine-men and magicians. Babylonia, Egypt and Persia are
l represented and the Hebrews were not without their peculiar and popular
der-workers. But when we come to the matter of miracles as divine
stations and revelations we must immediately take higher ground
in them we see an exalted moral and spiritual purpose. When we
w the history of miracles as recorded in the Old and the New
ments we find those of the Apostles upheld by as clear and
edible evidence as any others. They have a well defined place,
d when we review the same class of works in later and modern
es we are forced to admit that many of them possess like
fficient ground for credibility.

When we consider the objective possibility of miracles
e naturally begin with them at their earliest appearance
hen they were accepted as divinely given signs and fully believed
so-called credulous people. Then we come to the critical
eriod of disbelief which arose and continued with the
mistaken notions of some evolutionists regarding a supposed
violable and immutable reign of law. And in the third
lace, significant and natural as it is, we come to
ur own time when most clear, capable, unbiased
minds are recognizing the far-reaching and important
ct that the natural and the supernatural are not two

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but one, and that thus the extraordinary and miraculous are just as historical and scientific and trustworthy as the ordinary phenomena of life.

The deductions of theistic philosophy confirm our belief in the existence of God as Creator and immanent Preserver of all things; as one who has not shut himself out of his own universe but as one who ever rules, controls and presides over it, and thus may, as occasion requires, intervene either directly as in Paul's conversion or indirectly as through that same Apostle for the raising of Eutychus.

"All Theists recognize that the operation of spiritual forces is just as real and just as familiar an experience as the operation of material forces. An obvious illustration of the intervention of spiritual force in the phenomenal world is afforded by the consequences which ensue in the visible order every time we exert our free will. Mind is not a mere function of the bodily organism, and thought is something distinct from those movements of the grey matter of the brain which seem to accompany it perpetually in our present experience. But mind, i.e. reason, is a vera causa – a cause which produces effects in the physical order, effects which are often far-reaching and important. The action of man's free will, of which the outward effect is the motion of his limbs, is not a violation of the law of causation: that law is true only of physical causes, and the physical sequence is perfectly observed, so far as we know. But the originating impulse comes from a region other than physical, even from the domain of spirit, where man lives his highest life and from which he catches his highest inspirations. We shall see presently that there is no complete analogy between such intervention of human will in the physical order, and that intervention of the Divine volition which we shall find to be the characteristic of a 'miracle'; but, although the analogy is incomplete, it is important to recognize that we have experience of an intrusion into the physical by the moral order every time that we exert our wills to move our bodies. There are forces other than physical to be reckoned with.

Thus among the agents which can produce effects in the physical order spiritual agents must be counted; and of these the highest is God. And if we are to explain otherwise anomalous phenomena we must give due place to the direct volition of Deity."

The credibility of miracles is readily and clearly explained from this theistic standpoint. Once admit a God, and the possibility of miracles together with their naturalness are explained. For when we balance 'bilities and give due weight to the moral aspect we see that the Author of Creation may very naturally desire to give special manifestations of Himself, of His will and of His grace to the creatures He has ~~made~~ caused to exist.

Their value as evidence of divinity and divine authority may be seen in the fact that Christianity was based in part on the attestation of miracles. The Christian Church is a miracle of vast proportions. The resurrection of its great Founder is still more momentous; and the miracles he performed were not successfully disputed but rather used to establish the claims and extend the ~~domains~~ boundaries of his kingdom. As against those who have discredited them on meagre scientific grounds, we ask: Have they secured their own proper attitude and bearing; have they defined their own terms; have they rationalized and demonstrated all their own assumptions? We shall also ask: What is the ground and purpose of Christian miracles? that will decide their validity and worth as evidence, since a true miracle must be more than a mere show of power: It must proceed from a good source, aim at a good end and accomplish a good result. The miracles of Jesus and the Apostles were such, and as such they support their teaching as divinely authorized. We do not hesitate to accept them when we find that their character and quality are in complete harmony with the teaching of Jesus.

he fact that these miracles are all worthy of divine power i strong proof of their validity. None were wrought to please r satisfy the curious. No ostentation can be found in them. ll possessed a high moral tone and were fruitful in good esults. All were evidence of divine mercy, pity and love and ere meant to enhance and strengthen the message of life nd immortality brought to light in the Gospel. As were those of the supreme Master himself so were those of his postles with but this exception: they had not, or at least id not use, the power of performing cosmic miracles. The ed of such had passed away.

~~Explanatory~~ over

Explanatory

The miracles of Jesus as recorded in the Gospels re not only wonders but also signs for a definite purpose. ere marvellousness does not require a supernatural cause t may be the result of hitherto unknown physical com- nations that have no moral or spiritual meaning. Supernatural iracles are of a higher order but are worked out through t: operation of the same laws. Ordinarily we see and ow only a fraction of the working of these laws in the byrinth of their ramifactions in the vast universe, but God es and knows them in their entirity and at his pleasure an and does reveal some of their higher possibilities and roducts. Prof. Sheldon says, "Among the criteria of genuine miracles, nd conditions of their evidential value, are to be named in articular the following: (1) intrinsic and recognizable connection ith ends that may be regarded as worthy of devine wisdom nd benevolence; (2) demonstrated efficiency to impress men ealthfully, or to promote their moral and spiritual evelopment; (3) confirmation by a sufficient amount of honest and intelligent testimony". These are the three tests.

As to definitions we shall not attempt a discussion of the whole list offered by partisan or egotistic philosophers, theologians, scientists and metaphysicians to say nothing of unbelievers. But we may form a true and adequate definition of what christian miracles are in nature, scope and value by consulting the generally accredited miracles of the New Testament. And we may say hey are supernatural signs and wonders wrought through natural nstrumentalities by divine agency for beneficent and worthy nds. We say *supernatural*, not meaning that which is apart rom natural but as being native to a realm higher than ur ordinary level, but by no means unnatural. It is that i fact, which is more natural and more to be credited since t comes more directly from the finger tips of God. We say *igns*, not meaning mere shows but visible and tangible ndications of divine attestation. The wonders are not mere marvels of good or fearful import to be gazed upon but ather suitable and valuable means for illiciting human dmiration and confidence. The *natural instrumentalities* re, of course, men and things, creatures and laws, both of which are wholly within God's power, especially when the creature is a willing channel of divine graciousness. The *Divine agency* is found in the Trinity one or more of whose names are invoked and whose presence is manifested ~~by~~ in he event. The *ends* aimed at are such as affect the ntire nature of the subject for physical, psychical, moral and spiritual betterment, and which bring the divine purpose, power and presence into clearer understanding. With the three tests and with this defined definition before s we need not call for aid from Hume or Mill or Darwin Spencer for they at once fall flat since they fail to notice ome of these necessary characteristics. Drummond, Fairbairn, heldon and Bowne are much more to the point. The istinction between the natural and the supernatural has in late ears decreased very materially. Indeed we think we should peak more clearly if we should leave the word supernatural t of the discussion and in its place use natural while for that hich is beneath or opposed to the latter we might use the erm abnatural just as we do in the case of normal and bnormal. If there ever was a crying need for a systematized nd harmonious definition of terms in Theology it is to-day i the midst of the reconstruction of Biblical history and ctrine. For the purpose of laying broad and sufficient undation for the high demands we are soon to make let s indulge in a brief survey of the history of the Church nd miracles with special reference to those of healing i its various forms.

When we review the miracles of Jesus we see t once their universal scope. A glance at his many mighty works reveals the wide and various fields ~~and forces~~ in which he worked and the forces which he called o testify to his divinity. Heaven and earth and hell were placed i the witness-box. Angels and men and demons each in heir turn proclaimed his authority supreme. Life and death were equally in his hands; the sea, the storm, the plague, he crowd bent before his power. Devils shuddered at his glance: eath withdrew at his approach and at his command life burst gain the barriers of the grave. In the more than fifty miracles hich Jesus performed he always kept the means in strict bordination to the ends. There was no ostentation, no icantation, no slight-of-hand, no hypnotism; and no serious uestion was raised regarding his power which was not turned ack upon his enemies with double force. The relation of he Messianic miracles to the Apostolic miracles is seen in e method and the means and the results of each and in e fact that the former was the type of the latter.

An examination of the miracles wrought by the ostles shows that they were closely related to those of the Master all respects save that which we have previously pointed out. e then we may assume a divine restriction of the power in cosmic range based upon the fact that such miracles were longer necessary. The difference between Christ and the Apostles s greater than that between his works and theirs. ~~[illegible]~~. The halo of divinity at encircled him, his marvellous influence with men — even ith those who sought his life — and his immaculate character ave often seemed to set him entirely apart from his followers. ut although they were limited creatures their miracles were oble manifestations of divine reinforcement and hold a very ignificant place in the transition from divine to ~~human~~ ordinary iracles and we think their works appeal more directly to s because of their perfectly human level. Especially do we

l. their value when we see such men doing the "greater works" n the day of Pentecost. Well attested miracles of a high order formed through divine power by strictly human agents ought to e readily and easily accepted by us since the Apostles were given n. power and their works were the natural result.

The commission to these men was that they should each the presence of the kingdom *and* "heal the sick, cleanse h. lepers, raise the dead, cast out devils." Preaching and healing their various forms were the two great pillars on which the pire of Christ should be founded and sustained, and no word om Jesus has ever withdrawn or annulled the commission nor we find any authority given to or employed by the Apostles ereby the latter part was abrogated in any sense or degree. e modern Church alone, influenced by the materialism of the e, has practically if not theoretically countermanded it so at the Church, the Bride, has lamely limped for centuries. She s still two limbs but one has become much like a wooden mp so that she is herself in dire need of just such healing as she ought be dispensing to the world.

A review of the miracles of the Apostles as found in e Acts will show how fully they entered into and strove to fill the behest of Christ both before and after his Ascension. In is record we are told of the healing of the sick, the casting t of demons and the raising of the dead. In 5.16 we have e report of the cures accomplished at Jerusalem by Peter and s shadow; in 19.12 there is the record of similar cures t Ephesus by Paul and the handkerchiefs and aprons laid

upon his body; and in 28.8 the healing of the father of Publius in the island of Melita is ascribed to Paul. In 3.7 we have e renewal of impotent ankles by Peter and John at the Beautiful Gate; and in 14.8 a similar case relieved by Paul t Lystra. In 9.34 Peter is reported to have cured Eneas a aralytic of Lydda. In 5.16 besides the healing of the sick e read of demons being cast out by Peter; and in 16.18 that aul exorcised a spirit of divination at Philippi. In 9.37 bitha (Dorcas) was raised from the dead by Peter at Lydda; nd in 20.9 Eutychus was raised from apparent death by Paul at Troas. In 13.11 Paul called down blindness on Elymas e sorcerer of Cypress; and in 5.5-10 Peter's rebuke caused, or at east was immediately followed by, the death of Ananias and apphira. There is also the report of the Seventy who returned to hrist in great joy because they had proved the power of faith i the relief of the sick and demonized. As in the case of e miracles of Jesus so with those of his disciples, the fact eir nature and their value are all unquestioned and their elation to post-Apostolic miracles is one of continuance of e divine power and of their position as essential elements in the Christian system.

As to post-Apostolic miracles in the range of ealing we have an abundance of evidence from various trustworthy riters: Justin Martyr says, "Many Christians exorcise demons rom numberless demoniacs in the city of Rome and throughout the whole world." Irenaeus says, "That some cast out devils is a matter that cannot be called in question". Tertullian, proaching certain heathens, refers to demons being expelled by hristians without price or reward. Origen and Athanasius ~~stantiate~~ corroborate these by similar testimony. /

We are aware that many of the reports are padded d in some cases exaggerated beyond all belief but that there s a ground of truth and fact is not to be lightly disputed d ought to be admitted if the miracles satisfy the tests and definition. The question as to when miracles ceased in the tory of the church is a vexed one. Some say they ended th the Apostles since their function as evidence was no longer quired. Others say the power extended to ~~other~~ those disciples on whom the Apostles conferred it. Still others have thought t they continued down to Constantine when Christianity was otected by civil authority. The Romish Church has always imed the power, and various sects still seem to possess and lize it to great profit and advantage. We readily believe in miracles of Jesus and do not dispute the majority of those formed by his followers, at least down to the fourth century, d there is no good and sufficient reason why we should not cept at least some of those reported by later writers of er times. We are not asked to receive all, but only to ree to the fact of the persistence of the power as a permanent ssession within ~~the~~ human bounds, and even though it were oved that the power was unused for centuries, it would not proved to be non-existent. The claim that the law of vine economy forbids belief in many so-called miracles s not sufficient weight to shut out all such phenomena,

nd the fact that so-called modern miracles do not possess
he "sign" characteristic is answered by the other fact that
herapeutic miracles have not needed such significance since
hristianity became a world-religion. The relation of post-
postolic miracles to those of our own day is that of a
nnecting link between the Apostolic and the modern Church.
od has not left himself without witnesses to the truth
hich must save us from the sins of the soul, nor has he
ft us without examples of the power which must save us
om the ills of the body. The Fathers of the Church and the
ue followers of Christ in Mediaeval times, in spite of the
rkness which over-shadowed them, kept the sacred fire
faith ever burning on the altar of devotion and secured to
s this heritage of power.

Modern miracles of healing are unquestioned when
ey fulfil the full definition and satisfy the tests. Why call every
ch occurrence a mere coincidence? Why not give it its proper
me? Of what are we afraid? The cry that spirituality would
ffer is purile and unwarranted since education will maintain
r dual duty in proper balance. The cry that there are really
- modern miracles because there is no further need of them
ust be rejected as untrue: (1) because it is a careless generalization
hich overlooks the necessity of stating what kinds of miracles
e uncalled-for to-day; (2) because if it means that miracles
healing are not present-day phenomena there are thousands
take exception to the allegation; and (3) because if it means
at there is no pressing need of such it must be the

seless inference of a deaf, dumb, blind maniac who in spite of protest is himself an example of that very need. Opposed these two unfounded cries we present the cry of those who are dire need of aid. The cries of the whole and the healthy louder by reason of more strength, while the cries of the saken sick are faint by reason of low vitality. The latter, wever, demand a hearing. They need the physician and to et their need various organizations have sprung up.

Faith Healing in all ages has done much to alleviate pains and sicknesses of men. Some of its devotees and ders such as Dowie, Sandford and Schlatter have gone to tremes and received their just rebukes, but there are those e Simpson and his colaborers who preach the Gospel of Healing d base their practice on a saner philosophy and a safer eology so that at least some of the results they have achieved e incontrovertable. We must grant that they have done some ings of value in this field. If their exegesis is faulty let us fine our criticism to it but admit the facts regarding their actical pathological methods and results. Let us not nderrate, in our care not to overrate their worth. If they have scovered and improved a force or power which the church as lost or failed to utilize, let us not show a jealous spirit t rather admit it and give them credit while we take mmediate steps to retrieve our loss and restore the Church's ower. One Church there is which claims no need of such restoration and to substantiate its attitude points with pride remarkable cures wrought through the agency of various lies, pictures, pilgrimages and washings, but the innumerable ilures and the questionable methods discredit the whole scheme.

The success of Mental Suggestion as a power in ling is fast finding wider adoption. The followers of Swedenborg im him as father of modern mental healing but their silly chology regarding the influxes of good and evil into the brain d their excessively mystical theology are revolting. Mental ling as an art is not new but the readjustment of it on a entific basis is of late date. At first those who practiced utilized various material aids such as: an amulet about neck, a potato in the pocket, a strap ~~on the~~ around the ist, bread pills, colored water and the like. We do not, wever, believe that these things caused the cures but that resultant and sustained thought-attitudes were responsible the remedies. Such healing is not a religious result for it ay be accomplished by the atheist as well as by the theist t the latter is surely in the better position to expect and ceive and deliver the highest and most permanent benefits.

The great growth of neurotic and disordered emperaments is ever increasing. Nervous manias which attach t some strenuous lines of conduct, whether good or bad, are often eyond the powers of the ordinary physician or clergyman. Thus he opportunity for various kinds of medicine-men has arisen. The ëstablishment of the Church's authority and power in the above iseases has been taken up by such men as Worcester, McComb, allows, Quackenbos and others and bids fair to become an

ptant interest of the Christian ministry of our time and indeed
ll succeeding years. The dual nature of man calls for
icians and psychicians. Let each perform his part in
al association from the Christian stand point as colaborers
d God. No drug can cure a moral depravity and no suggestion
reach an organic dislocation but with the two-edged sword
diseases may be met and vanquished.

Christian Science has also produced a variety of
ts in this field. Its claims are enormous, much more so
n can be sustained by actual evidence. The claims are more
n the cures. This so-called Science has been critically
t with from many sides by able and distinguished writers:
m the stand point of metaphysics and philosophy by Professors
ne and Rishell of Boston University; from the theological and
rapeutic stand points by O. W. Hutchinson of Leominster, Mass.;
from the personal and legal points of view by F. W. Peabody
he Boston bar. All have shown the untenable, unscientific,
philosophical and unchristian character of the cult as well
its contradictory, heterogeneous, quasi-religious and
leading aspects. We must, however, admit three points:
hat any new cult or religious system is more easily and disasterously
cked at its inception and during its early developement than at
y other time; (2) that in spite of the grave and defenseless
lacies found, it possesses a peculiar vitality, whether inherent in
leader or in its organization, and bids fair to live a
sonable time; (3) that through its various agencies and

strumentalities it has gained wide prestige and has done some markable things for which "coincidence" will not always account. It is quite evident that those who practice this method are losely related to the long established mental healers and that ost of their cures are wrought through the mind. All true sychologists agree that the mind can successfully assail d drive out such demons as insanity, nervous prostration, elancholia, dispepsia, fevers, skin diseases etc. for scientists ave shown that the secretions of the body are governed largely y the emotional states of the mind. But the mind cannot fully re what it has not caused so we need hygiene and scientific edical treatment to supplement right thinking if we are to ucceed in physical maladies. Correct the organic and physical, d nature will do much to restore health while the maintenance various mental attitudes will greatly aid, augment and ccelerate the work of natural recuperation.

The cures which have taken place while patients ve been under Christian Science treatment have been shown to be ose which anyone capable of inducing hopefulness in despairing inds can readily perform. The true physician and the optimistic astor both may be *psychicians* of high order and effectiveness. My thesis is that it is now time for the church to recognize hese imperative possibilities and begin at once to undertake this eglected phase of her great commission.

In most cases of healing then, we see the portance of the mental attitude. Not that it is indispensible

we know that the physical constitution of infants and idiots and
le lower animals responds to drugs and curative agents without
ny distinct mental aid; but that the psychic powers may
d should be utilized in more ways than they are at present.
le commission to preach has never been abrogated nor has
e power to heal the sick been withdrawn. Indeed the truth
they have always been recognized by at least a few as
ing the twin bulwarks of Christian service. The stages in
evolution of miracles are unbroken. There is no missing link.
le golden cord of divine agency has remained in tact throughout
e ages. The Great Commission still awaits complete and
rmonious representation before the world. The Church ought not
be satisfied with preaching and visiting and keeping itself
nspotted from the world but should rise to her whole duty
hear the words, "These ye ought to have done and not to
~~ave~~ e left the other undone". The fact that so many unreligious
d non-religious agencies are coming to man's rescue ought to
a signal to the church to arise and dispel the darkness
d disease that enswathe the victims of sin.

Hortatory

The age of miracles has not passed away. Wonders
ver cease. The need is just as imperative as ever. The opportunities
e more numerous. The possibilites are more encouraging. The latest
ndings of philosophy lend more support than ever. The equipment
the church is more complete than in any previous age. Her
mands for purity of life and rectitude of conduct and Christ-
iness of character; her teaching of faith and hope and love; her
phasis on music and beauty and truth; her almost infinite
of suggestion and contemplation and example; her helpful
vironment with stress on healthful amusments and occupations,
ogether make the Church of Christ the most natural and powerful
ency in securing the welfare of the race.

The Church does not hesitate to perform grand moral
iracles in the lives of men. Why should she shudder and recoil
t the thought of dealing with man's physical nature? If she
n and does do the "greater works", why not the lesser? Surely
e God that stands back of the moral and spiritual
novation of men at the hands of the church, will not leave
r when she attempts to alleviate the mere physical
isfortunes which attach to life.

The charm of the impossible ought to attract us
pecially when we recognize that the impossibility is only nominal.
e have not yet wholly discovered the mighty forces that lie
t our disposal. We have not yet measured the sublime

ossibilities of a human life fully surrendered to divine ntrol. Let the Church come up to the help of the Lord gainst the mighty and the help of the Lord will come to r so that she may laugh at the impossibilities of aterialism and cry, "They are being done".

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W.G.C.

IIIII

Metaphysical Poetry.

W. G. Colgrove.

Long before the days of Homer the spirit of poetry was abroad. As each primitive community began to feel its strength and realize its power through conquest, it was natural that as the exultation of victory arose to a certain height, some individual should step forward and publicly celebrate, howsoever rudely, the event and the exploits of its central hero. As the enthusiasm increased the crowd began to dance and shout in irregular hilarity, then they would clasp hands and circle around in May Day fashion, singing to the beat of their rhythmic footfalls. It was on some such occasion that the most imaginative and creative mind among them conceived an idea of the relation that exists between regularity of motion and rhythm of words. From time immemorial this peculiar characteristic has persisted and has maintained an equal progress with the evolution of the race.

Since that discovery the poetic instinct has grown to high and far reaching proportions and has attempted every phase of life's activity, from the mere sensation of a twilight zephyr to the crushing deeds of Napoleon or the battle of the planets; from the develop-

× Your introduction is interesting but a little too
The origin of poetry is a vexed question. In any c
the discussion of any one kind of poetry does ne
cessarily involve the setting forth of the beginn
of the art itself.

† True; but your subsequent remarks concern the theme
poetry has used. Form in poetry means some
quite different.

‡ These antitheses are alliterative, but not real
Travesty is not the antithesis of tragedy. You have
used the recognised antithetical form of sentence
without establishing real contrasts.

ment of a tiny salamander sack to the immortality of the soul; and from the petty quarrels of children to the war on the battlements of Heaven.

The sphere of the poet is universal, the position of poetry unique. For years there seemed to be an uncompromising conflict between poetry and science, but that time has passed, and now as in the case of religion, so with poetry, science is its supplement and critic, ~~and~~ not its antagonist.

Poetry has assumed more forms than any other ~~form or~~ art of letters. We find it flourishing in travesty and in tragedy; in common place and in contemplation; in philosophical and in metaphysical speculation. Of all its forms, however, the metaphysical seems to have been least developed. The reason is not difficult to understand, for it is manifestly an almost impossible task to state ones metaphysical thoughts clearly through a medium so rigid, in one sense, as is pure poetry. Metaphysics is naturally a theme for prose, but in the long dynasty of regal poets there has been an occasional genius who was bold enough and sufficiently able to express his high cogitations in this way.

The scope of Metaphysical poetry is unlimited from one point of view, for in it we sweep the immeasurable vast and penetrate the unfathomable deep; but in another

× This paragraph might well be followed by a statement of the kind of themes which metaphysical poets select.

Almost every great literary movement produces its poet, or poets, with a metaphysical turn.

sense it is limited; for we must consider these things within the confines of poetic license. And in our brief study of this phase of poetry we are also limited by the fact that we are not considering the "Metaphysics of poetry", if such there be; nor are we studying the Poetry of metaphysics, although such a study might prove as possible and perhaps as profitable as a contemplation of the "Music of the spheres"; nor are we to discover poetry in metaphysics except when we speak of the ancient philosophers; but we must confine our thoughts to metaphysics in poetry or, as our title has it, Metaphysical Poetry.

This kind of poetry has a very long history, but is extremely rare in most of the extant works of both ancient and modern writers; and it is surely a matter of grave neglect on the part of ~~the~~ literary reviewers that there is such a dearth of data on a subject so important.

We shall begin with two definitions: metaphysics, and poetry. Metaphysics is that branch of scientific research which discusses the fundamental assumptions of all other sciences. It is the science of the sciences.

Poetry is that form of literary endeavour in which rhythmic expression and lofty thought portray the passions and emotions in the best and most suitable language. It is the art of idealization.

The nature of the metaphysical poet is such that he is not, as we say, born, but made; his mind must be an evolution both comprehensive and prophetic; he must hear all things, see all things, feel all things, in short, he must be an universal soul. We seldom hear of a youthful poet attempting such abstract compositions, although some like Bryant in his "Thanatopsis" and Browning in his "Paracelsus" have entered the border-land of such speculation. Ordinary poets are produced by nature but metaphysical poets by art. Their works are the result of extraordinary literary activity from an intellectual basis; they are not appropriations or imitations but richly wrought products of genius and education. All poets are contemplative and meditative, few seek to be metaphysical; they do not care to mystify the beauty of their work, and are usually afraid of getting into the ebb and flow style of thought, which makes a writer appear unstable in his argument.

The nature of such poetry is distinctly intellectual yet it is not mere metaphysical thinking, but by the analytic process it discovers and discloses its thoughts, while it constructs harmonious conditions about them in which they may readily crystallize. It deals with personality rather than with persons; with transitions of thought and psychic experiences more than with objective actualities. It must be realistic in so far as it portrays a correct picture of the inner psychical ego at work. It

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will be the poetry of sense more than of sound because of ts necessary, abstract nature. It will contain thought symbols nd intellectual subtleties, somewhat difficult to appreciate at times and often without a palpable basis; cloud treading, as Aristophenes put it, but different from that of Shelley who rode the wind of fancy and forsook the earth while in his hot pursuit; more like some saner poets who laboriously toiled up a golden stairway regardless of the cloud that covered it. Metaphysical poetry is unfit for the stage because of its intense intellectual nature; but the effect of such writing is to create a reflective and emotional state of mind which lingers with us to delight and profit, while the lighter poetry, as Browning suggests, is only a sort of substitute for an after-dinner cigar or a game of dominos.

The subject matter of metaphysical poetry is necessarily different from that of the ordinary type. It is more than psychological discussion which is so abundant in most modern poetry, for it steps behind the stage of our mentality and endeavours to discover the primal cause of psychic phenomena. It asks not merely what is, but what is is? It is more than philosophical speculation which we find so persistent in the work of the middle ages, for it rises a step above it and discusses the fundamental bases on which all philosophy and wisdom rest. It is more than mythological contemplation which was the centre of ancient poetry, for it has exposed the nonsense of many pagan beliefs and shattered the false fabric of their faithless fancy. We cannot say, however, that it is not indebted to some of these. In fact it found its first congenial tmosphere in the multitude of myths that hovered over the enchanted Orient and made such mighty thoughts possible. The translation of Ovid by Mr Golding gave many myths to the English poets around which they constructed metaphysical works. It is not less indebted to philosophy which afforded a ready channel through which to approach its higher themes, and if we should make a further study of the relation of metaphysical poetry to philosophy, we might be able to prove the assumption, that such poetry is the product of distinct philosophical epochs. Plato's writings have been the inspiration of much of this kind of poetry. We shall now proceed with some of the metaphysical poets and their work.

Commencing with the greeks we naturally turn to the poet-philosophers whose curious compositions in many different branches of research were written in verse. Here we have a broad based beginning not only of philosophical but also of metaphysical poetry. The dim, elemental theories of Thales, Anaxagoras, Pythagoras and

× It is, indeed, a complete system of metaphysics

× Not only so; but thorough comprehension of the *Paradiso* involves prior study of the philosophy of St. Thomas Aquinas.

others, together with the wonderful atomic hypothesis so vaguely discerned by Leucippus, all contained metaphysical thought which was for the most part couched in poetry.

Some of the Roman poets sought to compose more carefully in this style and have given us ~~some~~ many ~~splendid~~ good examples. Lucretius was the foremost among them and from his pen we have that curio in letters "De Rerum Natura" which is full of metaphysical speculation and philosophic thought. Virgil, Horace, Ovid and Seneca borrowed freely from the Greeks ~~but~~ do not display much that is metaphysical except in a casual way.

The poets of the Renaissance were inevitably drawn to philosophical and metaphysical study and methods, so that we are not surprised to find such works in the literature of the time. The Scholasticism of the middle ages played a great part in the development of this kind of poetry; but the few second and third rate names were easily out-splendored by the brilliancy of Dante's far-flashing genius. They have found oblivion, while this consummate master of poetic ~~power~~ insight has assumed the highest place, and with a powerful adaptation of the allegory has given to the world his "Divine Comedy" which is replete with metaphysical considerations. The Germans have contributed but little to this class of literature, although Goethe and Schiller are metaphysical in portions of their work.

Among the early English poets Chaucer, the best and greatest representative of the Mediaeval Epic School in England, is said to have had metaphysical tendencies, but there does not seem to be sufficient reason to place him in this category. In fact there are few names elegible for it until we come to the so-called Metaphysical Poets of the seventeenth century, of whom, together with three or four writers of the nineteenth century we wish to speak more fully.

Dr. Johnson, in his essay on this school, has assembled a number of extracts from each of these poets, and has endeavoured to show their metaphysical nature; but in reading them one is struck with their philosophy rather than their metaphysics, and it is quite possible that Dr. Johnson's work may be criticised on this account. Nevertheless such men as Donne, Cowley, Waller and Davenant have written much that contains metaphysical substance. One writer has said, "Although the literature of the seventeenth century shows no marvellous outburst of creative power, it has left deep and enduring traces upon English thought and language. The influences of the time produced a style of writing in which intellect and fancy played a greater part than imagination and passion. Samuel Johnson styled the poets of this century metaphysical. That tendency to intellectual subtlety which appears in the prose and verse of the Elizabethan writers, occasionally in Shakespeare himself, became with them a controlling principle". Johnson himself said, "They could not be sublime, because they sought for novelty".

Sublimity has the element of grandeur in it; novelty often becomes mere oddity, and one in the pursuit of it cannot expect to see or hear or feel great things. To fittingly describe the rugged magnificence of Mt. Blanc is to step at once into the realm of sublime literary composition, while to tell of some peculiar formation on its side is mere novelty; and this holds true from the metaphysical view point as well as from the physical. But it is unworthy in poets of this class when they undertake to supply their lack of loftiness by a wildly exaggerated novelty which grows to rank luxuriance. Shelley becomes metaphysical in thought and subtle in treatment, but so airy in expression that one feels that some of the excessive natural environment might have been better replaced by a clearer statement of the thought he wished to convey. We must also distinguish between subtleness and metaphysical methods and not conclude that a writer is a metaphysician simply because he is subtle; mere subtleness of expression does not necessarily constitute metaphysical composition but is often a means to that end.

Saintsbury says, "Donne had the faculty of suddenly transfiguring common things by a flood of light, and of opening up strange visions to the capable imagination." By means of this magical illumination of obscure and shadowy thoughts with the lightning of fancy he was able to enter forearmed into the thickest gloom and translate for us some of its everlasting silence. He was the chief exponent of the metaphysical school, and has left many passages of rare metaphysical poetry, for example, his famous lines on the propagation of light; his ~~this~~ thoughts of man as a microcosm and his ideas about love and virtue, where he says, "True love is an essence, pure, perfect, divine." and "Woman, in the highest sense, is the embodiment of virtue."

Some quotations from Abraham Cowley's work show his metaphysical side. If we take his argument against the charge of inconstancy urged by a former love of his, we see the metaphysical aspect in the claim that he is no longer the same person he was five years previously. In another place he talks of harmonising chaos, and in still another the wierd idea of life in death is treated from a metaphysical point of view.

Edmund Waller was the third important writer of this school, and although he has given us a number of very fine love songs we shall not stop to treat of his meagre metaphysical compositions. We shall turn rather to a recent work entitled "Platonism in English Poetry". It is well known that much of the lyric and romantic poetry of the seventeenth century contained the Platonic love idea. These are, speaking strictly, psycho-metaphysical studies, and in considering some of these the author of the above treatise says that Spencer, Milton and Shakespeare employed their philosophic minds in an intellectual quest for the origin of love, and concluded that it found its highest expression in the Platonic idea of two souls, not persons but essences, in love with eachother. The source and cause of such love is a metaphysical affinity which exists between certain souls whether together or apart. Spenser in speaking of his beloved considers her as beauty in the absolute, the only eal beauty in the universe. Milton in his "Paradise Lost" describes the infinite love of infinite spirits and often rises to the metaphysical plane when speaking of the nature of God and christ in their relationship to angels and men and devils; but he is more Christian than Platonic while Spenser is just the reverse. Shakespeare in his sonnets speaks of the love of his friend as the source of all love. ~~Addison strikes~~

Addison strikes a clear note in his "Cato's Soliloquy" n the immortality of the soul, and Pope in his "Essay on Man" has many thoroughly metaphysical passages.

Much of the religious poetry is of a metaphysical nature. Henry More's "Psychodia Platonica" contains a highly metaphysical treatise on the identity of the three great Platonic principles: the Good, the Intellect and the Soul, with the Christian conception of the three persons of the Trinity. William Drummond in his "Hymn of the Fairest Fair" deals in a masterly metaphysical way with the first person of the Trinity and proposes, like Plato, to show that Soul is an irradiation of Intellect, while Intellect is an irradiation of Good, and he says the same order follows in reference to the Trinity. He speaks of God as:—

"Whole and entire, all in thyself thou art,
All-where diffused, yet in this all no part."

In another place he says the world is the shadow of God and could not exist if the substance which cast it did not also exist.

Giles Fletcher in his "Christs' triumph after Death" expresses the idea of the souls' participation in the beauty of the ultimate reality, and developes a metaphysical theory of God as the "Idea Beatificall."

Both Byron and Shelley attempted the metaphysical style, and much of the latter's work has a metaphysical ring, but might, perhaps, be better called philosophical and introspective. It is said he intended to write a metaphysical treatise as a supplement to his poems. "Prometheus Unbound" is a good example of metaphysical poetry based on mythology.

But the greatest modern poet of this class was Robert Browning whose treatment of invisible realities puts him at the head of the list, in so far as he has treated them from a higher and broader stand point than the strictly psychological one. He has linked the dramatic and the metaphysic in the most difficult poetry of our time. "Paracelsus" is a unique metaphysical dialogue. "La Saisiaz" is a beautiful metaphysical poem on the immortality of the soul. "Dramatis Personae" is heavily weighted with metaphysical disquisitions, and "The Ring and the Book" contains many passages of the same nature.

Wordsworth, Tennyson and Swinburne have tried their abilities in this direction only to a limited extent, and Bryant, Emerson and Poe among American poets have contributed but little to metaphysical poetry. But in the realms of philosophy and psychology they have outstripped the poets of the past.

Your style has a number of excellent points — e.
variety, and an unusually abundant vocabul
But there would be a distinct gain if you could le
to prune it a little, and (while preserving its i
vidual character) to suggest a trifle of chastene
restraint.

The substance of the Essay is, in the main, go
but a more precise specification of the te
that stands as title would not be amiss.

Whether metaphysical poetry has created a place for itself in literature or has a value in moulding society may be a question for debate; but if the pursuit of such composition will help to make more Brownings for the world we shall not argue against it. Rather let it be cultivated by those who possess the requisite genius or in whom this peculiar aptitude or faculty may be aroused and educated.

Why should we not have more great poets both metaphysical and otherwise? Why should we not have one great poet-prophet and metaphysician who shall set the world ablaze and leave a lasting lesson to mankind? May we not look for the appearance of an Emersonian star to which we may tie our waggons?

Montreal, Christmas 1903. W. Gladstone Colgrove, 05.

W.G.C.

The Inevitable.

We stand upon the threshold of the ntieth century. In less than two years shall have passed beyond the pale of neteenth-century thought and action, and ll have set our faces like a flint toward more feasible economy, a more practical stem of ethics, and a diviner and therefore per philosophy of national existence. r, as with prophetic eye we peer into the sty future or flash our mental search-hts athwart the unmade pages of our tory, we recognize the on-coming tide revolution or discern the ominous cloud at mutters messages of woe.

The old maxim, "Coming events cast heir shadows before", still retains the gleam prophetic fire, so that from the present ondition of affairs we are compelled to claim, "Surely a crisis is at hand"!

ome would endeavor to retard its foray, ne would try to impede its progress, but "True Blues" of America say, "Let the isis come."

Every nation has produced its heroes; the tellectual giants of all time have been ged on by the stirring impulse of some jestic force to the accomplishment of ghty deeds. We grant that some of se men have been mere units in the regation of the human race, and yet, en placed under the control of this occult imulus, this irresistable spirit, this lent but most potent agency of heaven, e achieved heroic conquests and solved e problems of church and state with arvellous success.

As the quality of individual aracter fluctuates so does that of the tional spirit rise and fall. From e time of Adam to the present day ry rational being has been endowed th the psychic capabilities for constructing

character. Every civil community is a an
aggregation itation of individuals and is therefore
overned in its developement by the quality
f its constituents. There is not a power
n the world but owes its success and
ontinuity to the corner stone, the adamantine
itress, the impregnable rock of national
haracter as it exists in the hearts of
ur bravest countrymen.

But to-day our patriots are rare;
he foremost oarsmen of the "Ship of State" are
esting on their looms and allowing her
o drift a derelict upon a raging sea. Shall
he be wrecked upon the growling crags? ~~No~~!
he inevitable result of this lethargic states-
manship will be a powerful reaction which
hall shake this nation to her very core
nd shatter every member of her fabric.

What hell-born sounds break in upon
ur ears? Hark! - - -

Smack! and the assassin's pistol lays
brilliant statesman low.

Bang! and the rippling maxims

row a hundred warriors down.
Clank! and the thirsty sabers drink
nother hundred's blood.
Crash! and our gallant ships lie
attered on the deep.
Are these not signs of impending revo-
ution? Yea more, they are the unmistakable
idence that revolution is upon us. We must
nquer or succumb. The crucial test must be
dured; let us not surrender ourselves to foolish
timism or fall into ignoble pessimism, for
e nation, preëminently among the nations of
e world, holds in its hands the fate of coming
ears, and all signs indicate that we shall
ise to national glory or fall with as
nighty a crash as ever any eastern
mpire experienced.

Awake! America, defend your cause,
Defend Old Glory and the nation's name;
Awake! O Liberty, command the maws
Of every angry cannon now aflame.

Look for a moment at the domestic issues hich demand mature judgement and ad diplomacy; for example, the sensual, cial system of Mormon Utah; notice, if u please, that during the double decade ich has passed Congress has thrice acted laws prohibiting this threatening il, and for a time it seemed that Utah uld be free, but freedom has delayed, and w the very threshold of the Capitol is nished with the footprints of a grimy monster, t from the western plain has found his way Washington where like a vicious vampire may drink the very lifeblood of the nation. d unless our stalwart yeomanry rebel ainst this colossal error we shall be luded by a gigantic farce which is ily donning Herculean powers and suming Titanic proportions.

There must be a limit to this brazen famy. When calm persuasion and keen plomacy have done, when statesmanship fought to no avail, when no alternative eft but blood; then rein your steaming ds, then loose your dogs of war, then ht each belching mortar with a triple ge and rend the rock-ribbed battlements his terrific foe. Why should we be menaced such illegal fraud?

Arise ye statesmen, of a former time,
Defend with mighty force,
The freedom that we hold sublime;
Against this "Trojan Horse".

But our domestic problems are small en compared with the foreign fashes. The at crisis has swung the pendulum to the itical point and for better or for worse we ve launched, as never before, upon a policy in ich we are thrown into direct contact with the at powers that shape the destiny of peoples.

Hereafter our foremost national interest ust be the foreign one, and therefore we ust study the situation with tripled utiny and fourfold vigilance. Foreign mmerce is almost the only source of ternational complications, each relationhip being fraught with perilous assoc-tions and dangerous distress. But e impediments to our commerce are ing swept away, and even now America ay throw the gauntlet to any foreign ower, for our chances of commercial adership are manifold. But how much ore shall we defy encroachments upon r shores and institutions, when side by de the "Eagle" and the "Lion" stand invincible ~~vulnerable~~ before the world.

However, we do not want a political oalition with the Motherland, but we do ail an "Anglo-American Understanding" hich shall place us on an equal footing ith the Greater Britain. And how can his be best attained? By rushing headlong to complications? No! But by waiting ntil we are thoroughly established upon an mperial basis. Then and only then can ur relationships with another empire be ntirely harmonious.

There are three marked stages in the developement of our national history; first, Colonial Dependence; second, Isolated Independence; and third, Imperialistic Expansion.

For a while we bore the galling yoke of British insolence, but soon we burst the chains that fettered freedom.

For a hundred years we have existed in a circumscribed Republic, and thought that we enjoyed the solitude.

But to-day we might be termed "Imperial America" that by the inexorable law of the survival of the fittest, shall seize the sceptre of imperial rule and reign without a rival in the world.

We can no more remain in isolation. We must destroy the tarrif barriers that bind us, we must advance upon the breast-works of limited reciprocity, we must subvert the rocks of foreign prejudice and sweep the deep as commercial conquerors.

Our mercantile commanders must

be Lincolns, Grants and Garfields backed by the constant, enterprising armies of harmonious workmen, who possess an educated intelligence and know how to harness the forces of nature and apply her potent energies.

How can such an army fail of glorious victory? And what does conquest mean? It means that the throbbing centre of ommercial intercourse, of education and industry must move westward until America shall be a ~~cumulation~~ of all the elements and agencies of organized humanity.

And who shall say that from this nation of commingled bloods shall not arise a social order, a citizenship and a commonwealth; a patriotism a national glory and a religion which shall far surpass the Heroic and the Golden Age.

O fail not in the fight nor cease to be a man of dauntless courage in your day.

O fail not in the strife till Gabriel's larion call bids you repair to your eternal home.

O yield not up your arms until this

tottering earth shall be consumed, and
world on world shall rush through space
to seek the utmost corner of the universe.

But when the dawn of eternity is
gilded with the splendor of a new creation,
when the celestial and the terrestrial have
departed and all is brightened by the King
f kings, when new heaven and new earth
have come fresh from the voice of God,
nd he shall have assumed eternal, everlasting rule of all; then lay aloof your coats
f mail and throw aside your heavy helms
nd cast away your swords of war, for
onflict is past and in the beauty of holiness
e shall chant the praise and strike the
chords of the music of the soul. W.B.C.

Rufus.

February, 6th 1899.

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THE MORAL LAW

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P R E F A C E

In presenting this essay we are aware of the fact it is almost impossible to cover all the ground and make a perfectly logical discussion in the time at our disposal. Mr.Bosanquet said that the scholar's golden rule is never to quote from a book which he has not read from cover to cover. This would also be impossible for us but we have read some of all, most of some,and all of some and have made it a point to acouaint ourselves with the portions relative to our topic. Why should one read more? Must a person read universal history to learn of Alexander The Great or the Fall of Rome? The attempt to be exhaustive on such a subject would doubtless lead to results more voluminous than luminous.

If,however,there are criticisms to be made we hope they will be made before the author has to retire to his long home so that the faults may be corrected or removed so that they will not be left as a stumbling block in the path of future progress. We trust also that any embryo artiumbaccalaureus who may in future peruse these pages will do so in clear carefulness that he may not be misled by the sudden magical development of mole-hills into moumtains or some frightfully narrow escapes that are dexteriously accomplished by the deft manipulation of a split hair.

The only suggestion we offer is that the reader make a critical study of all authors that deal with this problem before attempting to scan the work before him. A critic must be highly prepared to undertake such a task.

Few great works appear without a halo of romance about them,so with this,the manuscript, just at the most critical moment,of its development,was surreptitiously appropriated by some unmoral individual and the author for a time was forced to persue other lines of thought.

In conclusion may we venture to feel assured that the effort to give some idea of the nature of Moral Law will not,in the words of Lotze,be thought of as"a hasty scaffolding full of instability,made faulty everywhere by the inexactness of half true analogies", but as a wellplanned effort to fight our way through the thickets of thought to the open sky and the clear air.

THE NATURE OF MORAL LAW, W.G.Colgrove.

The genesis and development of the moral faculty is primarily concerned with the principles of duty and right action known as the moral law and understood as absolutely imperative with regard to human conduct. In so far as this code is believed to be of Divine legislation it stands above all other rules of life although much of its content is contained in the ordinary national and local codes which have evolved from custom,tradition and habit and have gradualy taken the form of social law. The most remarkable transition of this kind came through the work of the Stoics who, with the aid of Roman philosophy and jurisprudence reduced the ancient forms to the medieval,out of which Christian theologians were able to force it to the flower of modern thought.

The moral faculty,Conscience,according to most writers,began with the race that is,with creation,and has been subjected to all the refining and developing processes which have influenced and moulded mankind. In a study of the growth of the moral faculty a comprehensive biological clinical examination of all the activities is not necessary although Mr. Spencer and others would urge such a scientific treatment,for when we read the story of human progress,we see that there has always been a moral nature in man which has sought and even struggled to press its claims and enforce its demands for a proper rational recognition.

In the Avesta the Persians spiritualized the great physical forces and surrounded the heavenly bodies with a supernatural atmosphere so that the highly wrought oriental imagination was enswaithed in a mystic halo and he thought of many natural objects as his gods. The powerful teaching of such leaders as Manu, Zoroaster,Confucius and Mencius made a lasting impression on on the minds of the people. It is true that many of the very ancient myths were still held in great veneration but these teachers were the moralists of that time and as a sample of their work may I quote the"Ten Precepts"which were so important in their moral observance." Contentment,returning good for evil,resistence to sensual appetites, abstinence from illicit gain,purification,coercion of the organs,knowledge of the writings,knowledge of the supreme Spirit,veracity,and freedom from wrath". Besides this,one must strictly perform his duties as prescribed in the Veda.

The knowledge of good and evil,according to Josiah Royce of Harvard university,is attained by the application of idealism supported by rational empiricism to concrete problems. It cannot be a predetermined product of any particular mind because it would be full of individualistic differentiations. The influence of contemporary speculation induces a tendency to dependence upon the conclusions of others which would reduce the personal value of ones own work. Moral goodness as an attainment is very different from mere inocense,it is much more. Many people owe their knowledge of evil to their lack of innocense Sin may be a source of knowledge but it is not a legitimate source. The person who pretends that he sins for a moral purpose is a liar,because all organic processes involve a certain balance of opposing forces,the common mistake is made when we deal with half truths which is a trick of the Devil. The essence of moral quality lies in choice,and when we choose we necessarily pass a two-fold judgment which includes both acceptance and rejection. The thing rejected was a temptation or there would have been no choice. Ignorance accounts for the lack of many temptations and also occasions the lack of the corresponding virtues. The strength or knowledge of the temptations cannot be the measure of ones virtues. One should maintain some wilful ignorance of many vices. The progress of the moral man is to be found in the constant victory over his temptations until he gains the habit of victory. The good man is he who has often defeated the foe and stands on the vantage ground of his dead self. He is vastly superior to the man who has gained his knowledge by many defeats. The strong man profits by the failures of the weak man . The experience of passion is not a sin,but the experiment of passion is. The moral man not only does not choose the evil but rejects it and accepts the good. It would seem therefore that good and evil are necessary to the development of the MORAL faculty.

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Among the Egyptians also we find a high moral level to which neither the Greeks nor the Romans ever attained. Homicide was punished by death,parricide with burning,and all similar crimes were equally severely dealt with. In the Book of the Dead there is the sO-called Negative Confession with its forty-two forms of sin which the good Egyptian must not commit,they also faced a final judgment when the all-seeing eye of the Deity was known to penetrate into the innermost recesses of the heart. The object of their moral law ,if we may so term it,was the preservation of life and the redemption of the sinner, but their morality was merely a way of escape from transmigration to a lower order of existence,often the one they thought they least deserved.

The Chinese differ from most of the other Asiatic peoples in having a strong but rude altruistic sentiment which formed the basis of their peculiar morality. The widespread and abundant traditions of China were collected and edited by Confucius about 500 B.C.and although he reduced them to a materialistic basis they have since formed the religio-moral tenets of the higher classes,while Taoism,Buddhism and Christianity have endeavored to find a place in the esteem of the common people.

When we examine the growth of the moral faculty among the Hebrews we discover something very different, their test of morality lay in the willingness of each individual to act in harmony with the will of Jehovah. Such willingness was,for a long time,thought to constitute real morality,and to mark the Hebrews as the most moral people of all time,but,inreality this attitude of freely bowing to the will of God is not only highly ethical but also highly moral and truely religious. Here was the basis of the Moral Law as we know it. In spite of it they gradually drifted into a much lower plane of morals and the prophets remind us that they later fell into many immoral practices so that it was necessary for Jehovah to bring punishment upon them. The claim that they were chosen because of their inherent moral nature is thus beside the mark,and yet,when we consider the pagan conditions in the midst of which they had to live and when we remember that we see them through the field-glass of the prophets we shall be more lenient and find it not so difficult to believe that their good qualities had much to do with the choice. They were the best,God could choose no other race through which to develop a theocracy. The institutions of the Hebrews moral code ,although copied in part from the other eastern nations,has a distinct moral bearing which is hightened by their natural religious tendency. Under the leadership of Moses we see the race gradually forming a consolidated commonwealth and growing up under the influence of a moral code believed to be handed down by Divine direction.

The Greeks of Homer's time were little more than a nation of barbarous warriors and robbers like those of the Scottish border with only an incipient form of morality within the family circle,but that outside it an unbridled laxity reigned supreme,even to the time of Pericles their social morals were very loose and the Athenian laws were for the most part bloodthirsty and very drastic until subjected to the powerful study of such minds as Heraclitus and Pythagoras,and later Socrates,Plato and Aristotle,who reduced them to where the proud Greeks could praise their humanity which did not permit even a slave to be outraged and allowed freedom of speech and also freedom of religion.

The Sabellian highlanders who preceded the Roman people had a peculiar kind of morals and if compared with our modern standards would seem inconsistent and even hypocritical while their successors hurled the false witness from the Tarpeian Rock,hanged the harvest thief and burned the incendiary. They believed that their laws were an expression of the will of their gods.

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When we examine the Romans for the basis of their meagre morality we are t once face to face with an exceedingly immoral complex against which even the ociferous declamations of the great Cato and the impassioned oratory of his de-oted colleagues could make no effective impression. The great nation was so full f internal decay that her irretrievable wreck is a byword in human history. hristianity alone was able to ease the shock for a few years when the world s stunned by its colossal collapse. The centre of their morality was the sac-ifice of the individual to the interests of the state ,its Spartan rigidity s gradually softened by the great influence of Cicero in his "De Officiis".

The Monastic,Ecclesiastic and Ceremonial morality of the Middle Ages long with the Scolastic method and Casuistry showed a more thoroughly ethical endency although in many cases its quality became marked by its almost endless erbage and meaningless detail. The books on Casuistry,particularly,robbed the orality of much of its spirit by endeavoring to lay down rules for breaking rules nd not being able to cope with the tangled mess of some cases,they thought out system of Probabilism which gradually gave way before the heat of the Lutheran eformation which spread over the continent and England.

Having now covered in a very limited manner the rise and growth of the oral Faculty we shall briefly consider the foundation of the moral law from the hysical the social and the psychical points of view.

From our cursory examination of the evolution of the moral idea we may eadily infer that it was but natural that such a universal feeling should result n what we call moral law, the physical basis may have been in the occurrence of variety of natural phenomena such as great storms,earthquakes,deluges and fires hich were continually displaying their apparently infinite power,each,in its turn liciting wonder and reverence as well as trembling awe.

The psychical basis may be seen in the mental effect caused by thephysical henomena mentioned above,the study of mythology,tradition and customs as well as he peculiar mental constitution of the race,but most of all in the remarkable utburst of philosophical reflection among the Greeks during their Golden Age.

The Social basis of the moral idea may be found,as Darwin says,in the law f affinity by which individuals are drawn together into twos and threes and arger groups such as tribes,clans and nations. Necessity was the mother of this nique moral invention,for in studying the powerful springs of action we recog-ize the universal desire for security,property contract and stedfast family re-ationships. Man acts as man should when he acts according to reason,and such act-on has always thrown him into certain faintly rules which,as time passes,and onditions become more complex,are strengthened,corrected and developed in the orm of laws. The harsh letter of these laws gradually comes into conflict with ome well defined necessity of conduct and there is then produced a new idea that e call the spirit of the law and which,in its essential significense,is the real oundation of Moral Law,and finally the spirit and the body of the law come to-ether and we call it The Moral Law.

Morality differs from legality in the same sense that moral law differs rom state law,that is,the former lays down principles such as"Thou shalt not teal" while the latter merely states what is the difference between one man's roperty and another's and so on through the whole category of these two laws herever they sustain a mutual relation. On this threefold foundation man has onstructed a most elaborate system of regulations and precepts of which there re three notable examples - The code of Confucius with its endless observations nd details, The Talmud of the Jews of which Christ said,"They bind heavy burdens nd put them on men's shoulders", and the books of Casuistry whose intricate ystem defeated its own purpose.It was this wordy compilation that called forth he vicious denunciations of the great mathematician Pascal and definitely turned he more spiritually minded Christians to the Bible for their moral guidance. orality, though undeveloped in respect to systematic content, is the foundation f the moral law and the law itself is the plan on which the whole structure is uilt. Socrates said that morality had two sources: the law of God and the law f man, and that as these were understood and codified the real moral law in its ully organized form appeared. We must now determine the thought area of our field nd state the problem before us which, as the title has it, is The Nature of the oral Law. Before we can proceed however, let us add a few more explanatory words. or example we may say that there are certain limitations on the breadth of our roblem because we are not supposed to discuss the whole lengthy history of law aking nor the voluminous bibliography on the subject. Our remarks are to cluster bout the elements, the principles and the application of its spirit to the life nd conduct of each citizen. Perhaps we should think at once of the Ten Commandents or the Decalogue as possessing a close relationship with the moral law. ur subject therefore, may be best thought of as the content of the law, and our bject the application of it in everyday living.

The Moral Law is the supreme rule of action intended for man by his divine Creator, and Whewell said that it is the law of God and the will of God which is made intelligible in its existence and operation by means of certain basic ideas of rightness such as wisdom, courage, temperance, justice, truth, purity, order, benevolence and reflection together with faith, hope and love, all of which are constitents of the internal standard of action which forms the content of conscience and is the so-called Voice of God. Webster said that the Moral Law is the will of God as the rule for the disposition and conduct of all responsible beings toward Him and toward each other, a rule of living conformable to righteousness, the rule of action obligatory on the conscience or the moral nature. The Jewish or Mosaic Code and that part of Scripture where it is written, in distinction from the Gospel.

From a general point of view it has been described by Baldwin as including:- first, the analysis of moral conceptions such as what is necessary or required stressed by Plato and Aristotle; second, the influence of the Stoic writers who held that that which is fitting should be determined by reason apart from the emotional nature of man; third, the Jewish or Christian conception of the law as declared and enforced by God. According to Lyall man is a helpmeet in creation because he thinks, feels and wills within the law of right and wrong, and although this law is not arbitrary it is eternal and enters into the essence of morality. It is our moral nature which possesses this law, which admits of it, which gives it concrete existence and which keeps it before our minds. And this law would be the same even though no human being were here to use it. It is this law, universal and eternal and working out through man's being that we gradually come to recognize as authoritative as the inner voice that halts, corrects and guides us if and when we are willing to obey in thought and conduct. Fleming said that moral laws are derived from the nature and will of God and the character and condition of men and may be understood and adopted by men as those endowed with intelligence and will, and therefore capable of understanding their meaning and significance.

In a still more general sense the Moral Law is the only essentially altruistic law in existence. It is the law of sympathy and reasonable self-sacrifice and the only law by virtue of whose observance one can transcend all other man made laws. Moral Law has two forms:-that which is stated in the indicative mood and that which is stated in the imperative mood. There is also the positive and the negative statement of which we shall have more to say soon. The spirit of the law never changes but its form may be slightly altered from generation to generation. In spite of the fact that it is superior to all other laws, it still possesses some features common to them. Comte said that all phenomena without exception are governed by invariable laws with which no volitions either natural or supernatural ever interfere, but we are not clear as to his meaning of the word interfere. We interfere with but we do not violate the laws.

Physical law calls for neither consent nor dissent from its agents but oral law is much concerned with both,for as Mr.Arthur very nicely puts it,"These re laws that were not written on the unconscious adamant of atoms but on the onscious ground of mind". and further on he sums up the essential difference be- ween the two by saying that on the one hand physical law is imposed by resistless orce without regard to the nature of its agents or the possibility of its ful- ilment;while on the other the moral law is given by an intelligent being to other ntelligent beings to specify and determine his proper relations;first,to other ntelligent beings,secondly,to nonintelligent creatures,thirdly,to unconscious hings,and finally,to specify and determine his relation to the Law Giver in the atter of obedience and disobedience. Its object is to aid to goodness and dissuade rom badness,while it is no doubt equally binding on both the principal and agent. he specific nature of the moral law,although difficult to state,will gradually ecome apparent as we proceed. Its scope is individual and social and also univ- rsal for it reaches to all members of the human race. Human conduct will be jud- ged by rules in which virtues are described,duties prescribed and sanctions fixed. s always,the paramount duties of man as an individual are self-preservation, self- ulture and self-control,he should have,as Juvenal remarked,"Mens sana in corpore ano". he should be clean,decent,industrious,careful,frugal,educated,aesthetic, trong,courageous,patient,just,and even beautiful or handsome,he should be master f his appetites,passions and desires as well as of his thoughts,volitions and ctions and what is more he should be willing to become,as Wordsworth suggested, uty's bondman glad and free".

From the social point of view his duties include an allembracing altru- ism,a sound sense of social relation,a clear conception of the interdependence of individual and social interests,an unprejudiced understanding of the requirements of moral law,in short he must respect life,freedom,character,property,order.truth and progress,as Mackenzie says,and that although some duties are,according to Kant, are perfectly obligatory as"Thou shalt not kill"or imperfectly so,as"Thou shalt be benevolent" yet they all demand a just proportion of obedience and must be performed if one wishes to maintain his position as a representative member of society. One should always strive to secure the"Satisfaction of the Social Self". Now the virtues that form part of the content of the moral law are very various and although they have been classified by nearly every writer since Aristotle it seems very difficult to reach any generally acceptable conclusion. Mackenzie points out that courage and loyalty were probably the first to be recognized; Courage meaning valor,fortitude and hopefulness,while loyalty means fidelity,perseverence and enthusiasm; and later on,when the individual was more fully recognized as such,the higher virtues of temperance and prudence made their appearance. As soon as personal relationships were established it was natural for fairness and friendliness to become a part of moral practice and these were followed by reverence and worship. Whewell says that the virtues belong to a deeper part of our nature than do the duties because they are the sources out of which our acts of duty spring""Virtues are what we are; duties are what we do". It is the one law that leads to the highest good, The Summum Bonum.

The elements of moral law are those pronounced attributes which distinguish it from all others; its manifest authority,its stand regarding right and wrong, its inherent strength and progressive purpose,its universality and eternity,and its absolute obligation. Butler said its authority is simply the subtle expression of its categorical character which Kant so formally and stringently upheld. and added further that this authority is threefold: first,it is simple authority, second,aught authority and third,must authority. the first is based on factual evidence,the second is backed by the persuasive power of universal rightness,the third is supported by irresistable force and is categorical in its very nature. It is with the second that we wish to discuss a little further - Bound up with the authority of a law there are the sanctions or punishments which,according to Bentham,are physical,political,moral,and spiritual,all of which are prescribed conditions in the face of which disobedience is perpetrated and by virtue of which order is resto—red.In Worcester,Mass.on Court House,Obedience to law is Liberty.

The importance of conscience is revealed when we discuss it in more etail. To begin with we fully agree with the statement that it is not only to e considered as having some influence in the lowest order of morals but likewise s being superior to all others. This is a constituent part of the idea or the aculty itself,and to preside and govern in moral matters seems to be in full accord with its nature. If it had strength as it has right,if it had power as it as manifest authority it would absolutely govern the world. Thus we see that lthough conscience is not absolute in authority it nevertheless creates a profound impression with regard to duty that needs only the realization by each individual that there is an internal aspect of the moral law called the conscience hich,being a law of ones nature,becomes practically imperative. It is here that eason enters and bids fair to be what Kant calls the only ultimate authority in oral life; an idea held ,as Mackenzie shows ,not only by Socrates,Plato,and Aristotle ,but by the Stoics and some of our modern schools. But neither sanctions or conscience nor inherent moral law nor practical reason solve the problem of he obligatory nature of moral law which is absolutely imperative,ultimate and ternal and which can be found only in the Satisfaction of the Social Self.

With reference to the principles of moral law we find some writers ogmatically setting forth their claims as final. One says that conscience is he chief principle in morals; another claims that will holds the highest place, nd still another demands that place for Wisdom, while Hume the Scotch philosoher goes so far as to include most of the mere elements as principles. He is o doubt right to a large extent because some of the elements are also principles, ut in a strict sense principles are those fundamental bases by which a law is uttressed and by virtue of which it operates. Discarding the claims of the autors just mentioned we shall discuss them in the order named and add one or two hich seem equally important such as truth and justice. Our list then consists of onscience,Will,Wisdom,Truth and Justice. The Conscience or sense of duty then is ne of the basic principles,it is as we have seen,a very remarkable so-called aculty which,according to some writers,mainly of the Intuitionist School, is inxplicable while others add that it may be educated and sufficiently understood or all practical purposes,whereas the Rationalistic School maintains that it is apable of scientific explanation although weaker Rationalists only assert that t should possible to write a working definition. Lyall makes a strong claim for onscience as the chief principle,~~and here we take our stand~~. The position of will mong the principles is unique since it has attracted so much attention from all sychologists. The assumption put forward by Aristotle and others that actions re moral only when they are voluntary and rational has served to place this principle in a strong light where it has been subjected to the attacks of modern sycho-ethical critics. Kant stoutly maintains that the rational will is the aramount principle. Wisdom,no doubt the fundamental basis of the virtues,has lways held a high rank among the principles of moral law. It is the right use of nowledge and since ones actions depend to some extent on insight so also do the irtues and since the virtues are the product of habit and volition so also is isdom the basis of the virtues but it is not on that account necessarily supreme. hewell decided that wisdom as a principle is paramount. Truth and Justice have stood as principles in moral legislation vaguely or clearly since the race began. They are the essential boundries within which the other elements and principles develop and without which they would become distorted,abnormal and unbalanced. Justice is the expression and maintainance of equality between individuals,corporations and nations and is based upon equality of subjection to law whether moral social or natural. Yet law is not the mother of justice but justice of law as a product of man's moral development. But for anyone to advance an argument for the superority of one principle over another or all others is manifestly supercilious and pedantic because these are things that are not to be compared,each in its own sphere is paramount while no one would be complete without the modifying influence f some other or others.

In a former paragraph we called attention to the difference between e physical and the moral laws. Let us look briefly at the relation of moral w to other laws. With natural law it stands related through the physical and ychological channels for it can have its effect upon rational beings only by ans of the body and the mind. Here again, as in the choice of a supreme prin- ple in morals, we find nearly every scientist of note making his own definition physical or natural law. Darwin, Spencer, Huxley, Tyndall, all different yet to me degree alike though this is no doubt on account of the nature ~~of the nature~~ the laws they are defining. But brushing these split hairs to ome side we all accept the more general and comprehensive view outlined by Mackenzie where says, "It may be sufficient for the present to distinguish between different nds of law such as those that are changeable or unchangeable, violable or in- olable; this gives us four classes in which nearly all laws may be arranged e.g
ose that can be both changed and violated --national laws;
ose that can be changed but cannot be violated --natural laws;
ose that can be violated but cannot be changed --normative laws;
ose that can neither be changed nor violated --notation's laws.
national law e.g. against murder, states that which MUST take place if the fety of society is to follow.
natural law e.g. gravitation, states that which does take place under conditions.
normative law e.g. moral matters, states what ought to take place in the life nd conduct of a respectable person.
notation law e.g. numbers, states that which always takes place arbitrarily, nalterably and universally.

Behind the law of the tribe there is the must of the majority; within he law of nature there is inevitable with its semi-categorical significance and he fitness of things; back of the law of God, if it were only the law of a sup- rior power we should still find the imperative MUST, but it is not the law of a uperior power only, it is the law of a superior intelligence with a supreme sense f justice, a merciful and forgiving attitude, and a universal benignity, and when riters of ethics are confronted by the law of God as the supreme law why do they ot discuss it? Is it not relevant in class, book or lectureroom or do we think ur moral duty is done when we study moral questions and say that to go further s to become involved in theological matters. What if we do have to accept, as an ssumption, the righteousness of God, and is there any moral question in which cer- ain hypotheses are not used as the ground work for consideration? This inquiry ay appear unsophisticated - and it is, but what is the answer if such there be? ince we all agree that conscience is the Voice of God, it is the major principle f the moral law and therefore it demands the most careful examination. Some of he laws of mathematics are only vaguely related to the moral law but they are onnected to the extent of being utilized in the computation of quantity and the atio of quality in human conduct. We shall not take time to discuss its relation o other specific forms of law such as Canonical, Criminal, Martial, Municipal, and thers except to remark that there is evidently a ouite close relation with all f them because they come under the general head of social laws. By contemplat- ng the relation of moral law with other laws we also see its relation with ethics nd nearly all the logies and isms which are connected with ethics. That morality s different in different communities and at different times is well known, and its volution is marked by the various forms of the standard which have appeared during he passing centuries. If we glance at the history of ethical theory beginning with re-Socratic philosophers like Heraclitus and Democritus we shall see that out of the teaching of the former came the Cynics under Antisthenes, followed by Zeno and the Stoics whose system leveled out to Asceticism and found its lasting expression n the monastic institutions of the Middle Ages. Out of the teaching of the later emocritus came the Cyrenaics under Aristippus with the theory, "Pleasure for the oment" or merely present satisfaction of present desires.

Then came Epicurus and the Epicureans with their motto,"Pleasure for Life" r act each day so that life's total may be pleasure. Out of this system there arose he far-reaching all-pervading theory of Hedonism with its hundreds of teachers and housands of devotees. These ideas were carried into mediaeval times and developed nto a peculiar form of Stoicism to which Christianity added its lustre but borrowed ome of its substance. Here again we find modern ethical writers such as Gassendi, obbs,Hume and Bentham taking up the old shibboleth and after a curious system of hilosophic trimming flaunting it before the world as a worthy and profitable idea. eside this there was the Sympathic School led by Dr.Adam Smith. The standards of his widely influential and perennial school may be summed up in its three principle octrines as happiness,good,and passion,with a subdivision,sympathy. We must now otice that oscillating between these two extremes we have the teaching of Socrates nd the Sophists,Plato with his metaphysical theory of ideas, Aristotle with his ystematized ethical treatise,and the famous Skeptics since Aristotle. In mediaeval imes nearly all the different forms converged in the marvelous system of Casuistry hile from a modern point of view these ideas have been changed or supplanted by uch men as Hegel,Spinoza,Hutcheson;Locke,clarke,Wollaston;Mill,Spencer,Green; tephen,Alexander,Caldwell,and the Mc.Gill moralists. It might be said that the entral idea of this middle,variable and somewhat eclectic school is the concrete ersonalty of man and that the highest expression of the standard which they present/is found in perfection.

Although the standards change and local morality follows suit,the law f the moral life remains the same for in spite of the variability of some parts of he content ,the evident gradual supersedence of one part over another and the slow ccumulation of additions as well as the temporary disuse of some portions,the ruth and the authority of the law is not impaired nor its grip on hunan conduct elaxed, these very portions now in shadow may some day be brought back into the unlight of universal recognition. We shall now discuss the problem of freedom and ecessity as essential elements in morality and thus see another side of the nature of moral law. The freedom of the human will has been a vexed question for ages nd we do not think that we shall be able to do it justice in this brief thesis ecause it would require a lengthy study of theology,metaphysics and general law. Which would lead us into some phase of the old controversy as to how far the laws f church or state or both have in their keeping the will and freedom of mankind. et us first consider some of the arguments against freedom:- 1. The universality f the law of causation - but this objection may be used in reference to any of he phenomena of human nature and therefore has no specific bearing on freedom. 2. The strongest motive is always followed. but the motive is part of the self and when a person acts according to the self,that person is essentially free. 3.The influence of circumstances such as habit,heredity,character etc. but man makes and nmakes his own habits even though they may be of a hereditory nature and what man is not held responsible for his own character since there are so many uplifting and helpful agencies and influences which he may utilize? 4. The science of statistics shows that men,the world over,act in a sort of regular uniform fashion. but this again offers no difficulty since it is such a vague generalization that it has no more weight than to say there is no beauty in man bacause all men have mouths in their faces;the fallacy is in thinking only of the uniformity of mens faces and failing to note the matchless beauty of the lips. 5.Kant claimed that freedom of will could not be proved psychologically. but let us ask if he didnot prove it himself in his peculiar manner of life and originality of thought. His own maxim for life was,"Never do that which you would not be willing that all should do the same". A moral man is conscious that he should act in one way rather than in another,in the right way rather than the wromg way,in the good rather than the evil. The fact is that if a man were not free,in an ethical sense,he would not come under the ban of law nor could we impute rightness nor wrongness to his actions, nevertheless ones freedom is limited by:- 1. The impossibilities inherent in the case. 2.The habitual misuse of his character i.e. himself. 3.The uniformity of activity in the growth of character i.e. there are certain methods which are helpful in developing life.

sh necessity is within the man himself ,controlled by his will ,used or not as
desired and therefore according to his own free will.

It is time now to ask what is it that is judged and also who is the judge?
re once more a difference of opinion confronts us and we have to proceed in a
ntroversial way. In general we are safe in saying that the thing judged is volun-
ry action but we must be more specific or the hair-splitters will be after us.
begin we shall accept Mackenzie's statement that will and act are but the inner
d the outer sides of the same phenomenon. Some writers assert that judgment is
sed on the character of the agent,others that it is on the nature of the motive
volved while still others argue that the deed is the object of such decision.
w it cannot be the character but the root of the character which is the intention.
person is not judged for what he is or for what he does but for what he wills,it
the voluntariness of the act that alone can be judged,not the nature of the motive
cause that is nothing more than a mere idea induced by a sensation either subjec-
ve or objective but an agent is not wholly responsible for an idea but for the use
makes of it. This brings us to some of the forms of intention which we have time
ly to name:- they are the immediate or remote,the objective or subjective,the
rect or indirect,the conscious or unconscious,the formal or material. These are
t all but are enough to show that intention is composed of many elements. Now when
are told that motive is part of the intention we ask,What part?or is the state-
nt true? Mackenzie says it is and adds that motive includes the greater part of
e remote,some of the immediate,generally all of the direct,nearly always the formal,
little of the material,and may be either outer or inner or even conscious or uncon-
ious,which last doubtless arise from reflex agencies.

From this it is clear that our definition of motive is not sufficiently
mprehensive and that the general recognition of the inportance of intention is also
ry limited. We are thus brought face to face with the debateable problem,is pleasure
ways the motive? but to undertake such a discussion would at once embark us on the
llows of a controversial sea and be endangered on every side by the fogs and shoals
Hedonism with its fallacies,paradoxes,ambiguities and sophistries. No,we shall not
tempt a discussion of any of these because each one has enough materialfor a book
its own, a single remark on each will suffice. Regarding pleasure as a motive we
y say that it is most likely that pleasure is a sequence rather than a motive e.g.
e may desire some pleasures as ends regardless of the resultant pleasure which is
ly a feeling whereas pleasures are objects which when gained bring pleasure with
em. Some say that pleasures cannot be summed,we may conceive of ultimate pleasure
the sum of all the different pleasures we have enjoyed in life e.g. a large cube
y be composed of twenty-seven small ones each self-contained and perhaps of diff-
ent kinds. Some believe that reason is a motive and we agree that it may be but
at it may even be only a part of a motive and then it is not the only motive.

Having discovered the object of judgment let us discuss the JUDGE or as
me say,the point of view from which judgment is given. Apart from the prevalent
ea that God is judge in both the moral and the spiritual realms we must consider
e role of man as judge. There are several views regarding this:- Adam Smith, e.g.
lks of the impartial spectator or the sympathic self whose judgment is always com-
nsurate with the synpathy it has for the one being tried. But in this view there
ems to be the fallacy of confounding volitions with the self and calling them two
parate selfs which is evidently not possible,rather we would say that there are
e volitions of the self and the self of the volitions.There is but one self which
ands back,as it were, and judges its own volitions. We thus reduce this theory to
e level of the moral agent as in the first case. Another view is that held by
ckenzie who thinks the ideal self is judge but this is not essentially different
om the first but is only another way of stating the idea. Nevertheless these and
her theories seem to show that there is possibly another point of view somewhat
fferent from and broader than the moral agent by which judgment is pronounced,and
is is no doubt the Social Self whose universal nature makes it the most capable,
truistic,rational and reliable Judge of all in whose hands every person will be
lling to leave his cause and even his conscience.

The nature of moral law ,we trust,is steadily becoming more apparent as
proceed,and now we shall give a brief outline of some of the main theories of the
andard and the first thing we have to notice is that the different conceptions of
e standard naturally arrange themselves under three heads:- 1.That which is ex-
rnal i.e. that which includes laws,codes and social requirements. 2.That which is
ternal i.e. that which includes conscience,duty,moral sense,and personal obligation.
That which is teleological i.e. that which includes the idea of an end,the poss-
sion of ideals,the culture of virtues,progress toward the good,and the attainment
personal and social ideals. The first is prohibitive and negative.The second is
sitive and imperative.The third is both positive and progressive. It is hardly nec-
sary to say that all political philosophers will naturally hold that the standard
external because they think,like Clifford,of the law of the tribe;like Hobbes of
e law of the state;like Martineau,of the law of God;and like the Stoics of the laws
nature in their own peculiar sense. Those who believe that the standard is internal
e thinkers like Shaftsbury and Hutchenson with their School of Moral Sense; Reid
d Butler with their commonsense and philosophical view of Conscience; Clarke and
llaston of the Intuitionist School with its perceptual and philosphical intuit-
ns;as also Kant with his Categorical Imperative. The third group view the standard
teleological and are the Hedonists ancient and modern ,the Perfectionists ofthe
ristian School;the evolutionists like Spencer,Stephen,and Alexander with their
eas of adjustment,survival,approximation,and progression. The Idealists repres-
ted by Mackenzie and Green. The problem is,can these different viewa be unified?
say yes.For just as soon as an individual becomes perfectly social the standard
ll assume all three positions. It will be external in the pressure of social re-
irements;it will be internal in each person who has by now become master of self;
d it will be teleological in the fact that the Satisfaction of the Social Self
ll be the goal of all proper modern social development. This is a new Standard
hose development and universal acceptance will be closely watched.

And now we shall briefly discuss some of the short-comings of several of
he foremost theories advanced by the leaders in this phase of moral philosophy.
he Conscience Theory is not acceptable because it requires constant revision and
ducation to keep it up to date,it is only a feeling or a consciousness of oneself
ith respect to moral standing,and although its friends claim that it is intuitive,
nderived,universal and soverign,they cannot make it the standard because there are
ther laws which possess these same characteristics.

The Intuitionist Theory is defective,on the one hand,because its greatest
xponent has been unable to formulate a true system of qualities and tried to evade
y saying that the notions about duty are too simple to admit of logical definition.
t is in fact out of the question because of the different conditions,education and
atural characteristics of men. On the other hand one is not willing to accept any
tandard without an analysis which in this case is impossible.

The Hedonistic Theory is faulty because of the vagueness,ambiguity and
onsequent misunderstanding among its followers. Some believe in mental pleasure,
ome in selfishness,some in the greatest amount of pleasure for the largest number,
ome in the pleasure of progressive good actions,and some in life according to right
eason and correct judgment. These modifications due to the intellectual caprice of
he founders of the different schools renders the system as a whole undesirable as
standard for universal human conduct.

The Idealistic Theory with Self-Realization as its standard appears,from
strictly ratiomalistic point of view,to be too intellectual and savors of an in-
ividualistic spirit which also makes it unworthy and unsuitable as the Moral Stan-
ard which is so essentially social.

The Evolutionist Theory comes short on the one side and overshoots on the
ther side i.e. its best practical offer is that of progress which is by no means
ufficient as a standard,while its best ideal offer is that of perfection which de-
ands a perfectly adjusted person in a perfectly adjusted state amid perfectly ad-
usted circumstances,but this is Spencer's Absolute Ethics which he himself saw to
e almost if not altogether useless as a standard for human conduct.

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Now,having examined several well-known theories and found them lacking
various ways,I desire to avoid splitting the hair again and therefore wish,in
osing,to suggest my own previously suggested standard for consideration namely,
e Satisfaction of the Social Self. In such a many sided theory every rational
rson may find just what will suit his or her case best as they advance in the
cial order and develop their portion of the universal organization.

This theory is upheld on the philosophic side by the fact that it pre-
nts no barrier to any recognized philosophic system or school of thought; it is
pported on the philological side by the mutual signif~~f~~icense and relation of its
rms,"ego" and "socius" which,according to Baldwin,are easy to understand,and
en we note the meaning of satisfaction we see that it is not the mere fulfill-
nt of desire but the fulfillment of all moral desire.it is maintained on the psy-
ological side by the by the fact that an individual cannot think of its self as
art from others or outside the pale of the organization. It is supplemented on
e ethical side by what is best in the principle theories of all ages. Under such
standard ,covering as it does,the individual's rights,society's requirements and
e moral progress of humanity,every one will be able to realize the Summum Bonum.

Finally we must again call attention to the fact that the nature of the
ral law is such that it is impossible to state it in so many words,but that from
general critical survey we begin to get at least a partial understanding of what
at mature is. Although this limited view is all we can obtain at present,we must
member that when the operation of the law shall have effected the mighty changes
ich it promises and shall have exalted human nature to its highest degree,when mundane
nsiderations and social requirements shall receive their proper recognition we
all be in possession of more complete data and be better able to discover the
ture of the law in the brilliant sunlight of its universal sway. Then we may say
th Matthew Arnold,

"Then,when the clouds are off the soul,
When thou dost bask in nature's eye,
Ask how she viewed thy self-control,
Thy struggling,strained morality".

W.G.C.

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THEOLOGY

XXI

was ever acquired. During the past thr years the Society's head office, the si since 1893, has been two small roo in a house on Ross Street—hopeles inadequate *either* to house all the libr *or* to transact the volume of busin done by the Society. Our National Pre dent, Dr. R. M. Petrie of Victoria, his recent letter to members summed our needs: "Our present quarters quite inadequate and Council will be satisfied until we have a home wh is worthy of the size and prestige o National Astronomical Society."

A BUILDING OF OUR OWN

In January of this year, after consul tion with competent business advise the Property Committee of the Natio Council recommended the purchase o house at 252 College Street near University of Toronto. An offer to p chase, signed by the National Treasu on January 12th, was accepted.

This house provides, without alterati four rooms well suited for the Socie office and library and four small s contained suites for rental. For the f time we will have office space "wor of the size and prestige" of our Natio Society.

THE COST

The total cost of the property is $32,5 A minimum initial payment of $12, must be made by March 1st. The Soc can obtain a mortgage for the bala with the privilege of reducing the pri pal at any time without notice or bo

From the reserve and operating funds of the National Society we can muster $13,000.

* * *

A NEW ERA

We believe that this new venture offers us an opportunity and a challenge to expand the services to the Centres—to unify and revitalize the Society. Should we not begin this new era with our headquarters completely paid for and furnished? To do so we will need $22,000. We feel that we can obtain as much as $10,000 from government sources and from foundations. But we must demonstrate to these groups that we are solidly behind the Society; we can do this only by contributing ourselves.

* * *

$2,000

Let us therefore set our own sights at $12,000. Already donations of $2,000 and $100 have been made by two generous members of the Society. Can we count on *you* to help too? Will you let your contribution reflect your means and your interest in this important undertaking? Will you send your contribution to the Treasurer before moving day, May 1st?

* * *

All contributions to the Royal Astronomical Society of Canada may be claimed as Canadian income tax deductions.

DEDICATION

This booklet is dedicated to our aspiring youth who feel that the present interpretations of these important items are not sufficiently modern.

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INTRODUCTION

To some who read this booklet for the first time there may be a little hesitation about accepting some of the ideas expressed because of their modern aspect, but to those who are acquainted with the theological trends of modern science and the scientific trends of modern theology,there should be no serious difficulty.

The harmony of science and theology is being made a subject of close study by both sides because of much agitation regarding their unnecessary differences.Both have made assumptions whose dogmatism and weakness have made it necessary to change or discard them. We must keep an open mind to recognize the clearer harmony. It must be scientifically sound and theologically sane.

The purpose,therefore,in this booklet is to present prayerfully considered interpretations which will do no injustice to the biblical record and yet will give modern science a fair deal. And we ask that no reader indulge in snap judgments on problems so vital as these without some knowledge of the literature on both sides of the subject.

The above has reference to the problems in PART ONE. PART TWO deals with closely related matters,and PART THREE considers several practical questions that have been subjects of much discussion in recent years. We hope our answers will be found satisfactory to some of our readers,but we also fully expect many suggested changes regarding their form and wording.

W. G. C.

--- PART ONE ---
Problems in Genesis

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1. WHAT ABOUT CREATION ?
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12. WHAT ABOUT CHRISTIANITY ?

Its amazing story; Its unique methods; Its achievements.

MORE QUESTIONS PLEASE

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--- PART ONE ---

1. WHAT ABOUT CREATION ?

Before the Beginning, mentioned in the Book of Genesis, he Universe was an infinite space filled with tenuous gases. t was not created but coexisted with God through all eternity. nd now, because of Creation performed by the divine will, it ontains all things, seen or unseen, except God, but is not full et, and the process of evolution cannot fill it because it is ithout boundries.

Since the three Persons of the Trinity are very prominent n the work of creation we shall discuss briefly:

A. GOD THE CREATOR.

God is the Supreme Being, the only uncreated One, without eginning and without end, and possessing in perfect measure all he attributes we associate with moral Deity. He is a divine Peron who manifests himself as Father, as Son and as Spirit. He is he all-wise all-powerful Creator who, in the Beginning, by the reative power of his thought and will, caused the atomic constitents of the universe to become physically and chemically active nd to take the forms of the Original Stars and of all the Original istinctive racial Types of FLORA and FAUNA on this planet, including ur Original first parents. To the Flora or vegetation He gave nconscious life, to the Fauna or lower animals conscious life, and o our first parents self-conscious and God-conscious life, together ith personality and moral and spiritual faculties. All living types ere endowed with inventive and reproductive powers. This concluded reation Proper, and was the beginning of God's kingdom on Earth. t also set in motion the universal divine process of Evolution.

B. THE SON OF GOD.

Jesus Christ is the sinless Son of God under whose superision all the Types mentioned above, and their necessary laws of peration were organized, so that evolution might properly work out he varied and wonderful ideas of God. As the centuries passed, men ecame sinful and it was necessary for God to institute some plan y which to help them to regain their lost estate. Then it was, in he fulness of time, that, at the call of God, his Son offered to be he victim to suffer the punishment for the sins of men that they ight go free and be reinstated in the family of God. Jesus thus ore our guilt on the cross and provided what is called REDEMPTION or every member of the human race through his vicarious death on hat Cross. Men were not consulted regarding this method nor its purpose, it is a free gift of God which must be accepted by faith. The birth of Jesus, about twenty centuries ago, has for many years been thought of as a supernatural event, but whether supernatural or otherwise, the HOW is of little importance compared with the FACT of his life, teaching and resurrection. The method of his birth is not a tenet of belief for our salvation. Since He returned to heaven He has been our advocate and has associated himself with his Father in the maintenance of all creation in the space falsely called the sky, and on the Earth where everything is undergoing and enjoying the remarkable process of Evolution.

[illegible]. THE SPIRIT OF GOD.

The Holy Spirit is now God's chief agent in this world and was sent here to fulfil the departing promise of Jesus to his disciples when He returned to heaven. Jesus said that He would be another comforter who would guide men to THE truth. The Spirit, like God, is everywhere and is always engaged in many forms of service for God and man. In special ways He stirs our consciences, guides our thinking and comforts all who trustfully yield to his holy influence. He also urges sinners toward right conduct as well as faith in God and Christ. In the New Testament we read, "He will reprove the world of sin, righteousness and judgment". Which probably means that He will remind men of the very serious nature of these things.

For those who are not aware of the failure of three once-popular scientific theories about creation and its duration, we shall discuss briefly:

[illegible]. THE THEORY OF EVOLUTION.

During the centuries that have followed creation, myriads of different species have developed by the operation of natural law from all the original types, and they are what we see around us in the universe today. They were not created but have evolved. This clearly distinguishes between creation and evolution while it favors the biblical record and the findings of science. Evolution is not creative at all but only procreative with variations but this ability to produce variations has never resulted in anything approaching the higher attributes of man. There is therefore no adequate evidence that man evolved from any lower animal. The missing link is still missing.

except in man.

[illegible]. THE MECHANISTIC THEORY.

Some years ago a group of notable scientists thought the universe was an intricate machine which had come into being by CHANCE. This limited view, which could have no place for the higher gifts of man, has been abandoned by science which suggested it. Sir James Jeans said, "The Mechanistic Theory has already shot its bolt and has failed dismally on both the scientific and the philosophic sides". And Professor Max Planck, originator of the Quantum Theory said, "We have gone this far without God, but we cannot proceed without Him". Many modern mathematicians and most astronomers as well as several outstanding geologists agree.

[illegible]. THE HEAT-DEATH THEORY.

Until recent years this theory, also known as the Increase of Entropy or the Second Law of Thermodynamics, held that the constant expenditure of mass in the form of radiation by the Sun and stars would finally produce a condition of universal cold which would end all life. That so-called law, however, has been superseded by the new knowledge that such radiation is produced by the change of Hydrogen into Helium as demonstrated by Professor Bethe in his Carbon Cycle at Cornell University. The supply of hydrogen in the universe is so vast that no one can conceive of its last atom. Heat-Death had nothing to do with creation but only with its slow destruction, which, however, seems to be a mistaken assumption.

2. WHAT ABOUT THE SOLAR SYSTEM ?

Since the Sun, Earth and Moon are prominent in the biblical count of creation we shall discuss briefly;

~~1.~~ Sol, the Sun.

The Sun is one of the Original created stars which has proced and controls a planetary family of its own. Its diameter is ght hundred sixty-four thousand miles, its distance ninety-three llions of miles. It is the nearest star to this earth and all fe here is wholly dependent upon its almost changeless light,heat d energy. Other Original stars are no doubt acting in a similar nner,but we cannot see their families with our largest telescopes. sides this evolution of planets from certain stars,there is now e belief that stars are being evolved by the action of other stars the dust and gases in some areas of space. The light of the Sun about three octillion candle-power,and it weighs four millions tons per second. Its heat per second amounts to about 900 sextlion calories and its energy to five hundred sextillion horsewer,and its own weight is two and a half octillion tons. But our ystar is only medium in size,in the depths of space there are ny others which are millions of times larger than it.

~~2.~~ TELLUS, THE EARTH.

The Earth is one of the nine planets which revolve around e Sun. It is of small size,being only seven thousand nine hunred miles in diameter,and less than a millionth of the Sun's size. is the home of all the families of plants and animals that have erged from the original types established here by the will of God ey could not exist on any other planet because those nearer to the n are too hot, while those farther away are too cold. ~~As we have marked under 6.~~ This Earth is no doubt the result of a long perd of evolution based in the Sun,and all life here has developed the same divine agency. There are several theories regarding the ssible origin of the Earth but they all come short in certain spects. One may make a temporary choice but they are only guesses ile the one stated above seems far better than any of them.

~~3.~~ LUNA, THE MOON.

The Moon is also a product of evolution based in the Earth d,according to some scientists,may have been thrown off by the rth when it was rotating much faster in an early stage of its velopment. Some think that perhaps its place was immediately filled y the surrounding waters to form the Pacific Ocean and thus leave he continents bare for habitation. This process of evolution with gard to the Earth and the Moon would seem to do away with God as their reator since the writer of Genesis says that God created the Earth. ut if we interpret this as meaning that the Earth was part of the un,and the Moon part of the Earth,there is no great difficulty. volution does not begin until after creation which is not a process n time like evolution,nevertheless both are Divine methods.

3. WHAT ABOUT LIFE ?

1. Its Origin.

We have already answered this question on page one. Life s a gift from God when he caused the Original created things live,and since it is not a material thing,it cannot be dis-vered. If one wants to fix its beginning on a certain date in e unknown past he will have to wait until some mathematical nius solves the riddle by calendar reversal. The dates in some our Bibles,in so far as creation is concerned,are completely roneous when compared with the results of our present careful ronological data. They were suggested by an Anglican bishop out three hundred years ago,and are not used in modern Bibles. ny biological students of the past have claimed that they had scovered the source and beginnings of life,but when their work s tested,it was found to fall far short of that long sought-for al.No reputable scientist today believes in their results.

2. LIFE ETERNAL, LIFE EVERLASTING.

This question requires a good Greek lexicon in which we scover that the word for eternal is AION which means AGE or a mited period of time and is therefore not equivalent to the rd AIONIOS which means EVERLASTING. In some dictionaries they e said to be synonyms,which is evidently a mistake. And several anslators of the Scriptures have made the same error so that e punishment of incorrigable sinners is pictured as lasting for-ver,which is entirely unlike the teaching of Jesus. Indeed it is fficult to believe that God,whose great love and mercy redeemed l men, would keep sinners alive as long as He himself shall exist r the purpose of exacting justice. That surely cannot be.

Everlasting Life is very different from Eternal Life as we ve seen. It is God's gift to the faithful in the form of a sup-mely happy existence for all who,by their fine quality of faith d service,have reached heaven. It is vastly more than eternal cause there is no end to its duration. We must remember that we e responsible to God for the way we use his gifts and that our e of them will determine whether we shall enjoy that privilege not. We are glad beyond measure that we know God is just AND rciful,but we must not presume upon his mercy.

3. SOME WORDS TO WATCH .

They are eternal,everlasting,made,created,and some verbs.

We have just discussed the first two,and now we shall dis-uss the second two a little further. In the biblical story about reation made and created are used as synonyms,which,in our opinion, s improper since made means to form or construct by hand, but create eans to cause by divine will from the uncreated atomic material of he universe. God did not make anything,much less form it out of not-ing,He simply willed that it should be. The claim that creation is till going on is not established, but the idea that divine evolution s responsible for all forms and species which are in the world now. s quite credible. The third group is composed of some verbs which ere then ascribed to God by the writers of Genesis. They say He AID,SAW,CALLED,DIVIDED,MADE,FORMED,PLANTED,COMMANDED, But we must ot think of God as a great manlike being.

4. WHAT ABOUT MAN.

1. WHAT IS HE?

Man,as we know him,is no doubt the product of a long period of evolution from our Original Parents. We believe that the human family is an entirely different group from all the families of the lower animals. The animals have instincts but men have minds,ambitions and aspirations as well as a desire to worship. When man was created he was endowed with conscience,personality and moral and spiritual capacities. Having been created in the image of God,he has attributes like those of his divine Parent. In God they are perfect,but in man their degree is a measure of his likeness to God. Man is a free moral being who can do as he likes,but God has warned him about doing wrong. According to the much discussed writings of Huxley there is an enormous gulf,almost infinite,between the lowest man and the highest beast. And when we turn to the New Testament we find that there are three conditions of man:- natural, old, new. The natural may become old or new.The old is sinful,the new is loveful. They cannot live together except in a hypocrite.

2. WHAT IS MAN'S RELATION TO GOD?

The relation of man to God is very close because both are persons and,through man's vital connection with his original parents,he is necessarily a child of God. Since he has been freely redeemed by the unmerited gift of God in Jesus Christ's death on the cross,he belongs to God,and as an obedient child,he is expected to recognize that divine ownership.However,most men have not done so and still continue in sin instead of seeking forgiveness and enjoying the release of reconciliation. This has made it necessary for God to institute a world-wide effort by his church to win them back to himself. If,notwithstanding,man refuses to seek and obtain forgiveness,his refusal will result in the loss of the benefits of redemption,the joy of pardon,and the privileges of fellowship in the church of God. Moreover,if one dies still un-repentant he faces the greatest possible loss the human soul can suffer,namely,ETERNAL punishment. As we have already seen, this will be a definite period of time,the length of which will be determined by the nature of his sin.

3.WHAT IS MEANT BY SIX DAYS ?

Since it is said that man was created on the sixth DAY, let us discuss it for a few minutes. According some writers the six so-called days of creation were long periods of time bounded by a beginning and an end. But it is not unscientific to think that they may have been regular periods of daylight and darkness such as we have now. Why do some think that God needed more than six such days to accomplish his task? He is all-wise and all-mighty and could do it ,if he chose,in a single day. It,for Him,was not a time and energy consuming task.And so we run counter to reason when we try to fit the Creator into our time scale. We shall show wisdom whenever we refuse to try and time the activities of God.

5. WHAT ABOUT TEMPTATION ?

1. THE GARDEN OF EDEN .

Several distinguished authors have tried to give us a rd picture of the location and appearance of that garden in ll its fabulous wonder,but it has never been discovered. One n particular,has tried to show,at great length,that it was ituated near the geographical North Pole because some fossils f plants similar to our tropical flora have been found there. n Genesis its location is somewhere in the rich valley south f Babylon. Now it was in this garden that we are told that the evil,in the form of a serpent, tempted Eve so that she took the orbidden fruit and ate it and also gave some to Adam who should ave known better than to eat it, but he did and together they isobeyed God and thus sin came into the world. In the New Testa- ent we read that the wages of sin is death so sin and death were aused by Satan the great deceiver.

2. TEMPTATION

We know from the teaching of Jesus that Satan is an abom- nable lying creature who is chief of the evil spirits which con- tantly tempt mankind by misrepresentation and falsehood. That some olks do not believe in his existence does not do away with him ut only reduces the clarity of the disbeliever's mind. The source f GOOD is God,the source of EVIL is Satan. "Yield not to temptation or yielding is sin",and keep in mind the biblical statement that ell was prepared for the devil and his angels. It was not made for an,but sinful people,by their sin,make it necessary for God to end them there. But we should remember that sinners may be for- iven if they will earnestly seek it with full determination to turn rom their sinful ways,"Ask and it shall be given you,seek and ye hall find".Surely nothing could be more reasonable.

3. WHAT ARE ANGELS ?

This question is easily asked but it is not so easily ans- ered. Nevertheless,when we read about them in the words of Jesus nd his disciples there seems good reason to believe that they exist nd are the messenger-spirits of God in heaven and on Earth. They are aid to be endowed with power to appear in human form and we find hat both God and men are reported as having appeared in angelic orm. Besides these spiritually exalted servants of God,there are vil angels who are said to have fallen from their pristine purity, hen Satan was cast out of heaven,and together were consigned to ell from which they constantly tempt mankind.That will be their eadquarters until they either repent or are destroyed in what is called he second death,when all evil will be annihilated. Then besides he two kinds of angels there are the demons that are often called evils,which are able to enter and control both man and beast. We re told they are unclean spirits that often cause much harm such s physical disease and mental disorders. In the New Testament we read that they can be cast out and that Jesus often exorcised them. Apparently they are aware of the nature of their future punishment.

6. WHAT ABOUT SIN ?

[illegible]. ITS NATURE

Sin is disobedience to the will and law of God and must
e punished in a measure commensurate with the offence. It is
matter in which free choice has consciously accepted the wrong
ay and is called transgression because it proceeds across or
gainst the right,even in the presence of the right. The Jews
aid that it was a missing of the mark,thus indicating that to
e good demands not only wise judgment but also fine skill.
atan is its source and therefore it is enmity against God who
as graciously offered to help us make the right choice. To
ctively and consciously commit sin against God or man,by thought
ord or deed,requires that one turn a deaf ear to the voice of
he Holy Spirit and turn a listening ear to the false argument
f Satan. It amounts to a refusal to do what one knows to be
ight,and a willing obedience to do what one knows to be wrong.
ll have sinned but all may be forgiven. Some one has said,"To
rr is human,to forgive,divine".

[illegible]. WHY ARE SINNERS SAID TO BE LOST ?

Because they have allowed themselves to be deceived by Satan into choosing the wrong way of life. Like the prodigal, they have gone into a far country and,while they are away,they are lost from the kingdom of God. But God patiently waits for them to return,and Jesus said He came to seek and to save the lost. In John we read that God so loved the world of mankind that He gave his only begotten Son,that whosoever believeth in him should not perish,but have everlasting life. Many ask if there may be another chance to repent and believe after death and the answer is,there are several passages in Scripture which seem to favor such a possibility,but there is no certainty nor guarantee of it. It is very unwise to take such a meagre chance when one's future destiny is at stake. Especially since we have a sure way provided by God in Jesus Christ.

[illegible]. WHAT IS CONVERSION ?

Conversion means a determined refusal to continue in sin, combined with an equallydetermined espousal of a pure way of life. And this can be accomplished only through faith in Christ. To put it in another way,the question, "What must I do to be saved?" can be answered in the following form:--- SEVEN GOLDEN STEPS:-

YOU must accept God's free gift of REDEMPTION by faith.
YOU must fully CONFESS,REPENT and SURRENDER to God.
YOU must RENOUNCE COMPLETELY your sinful way of life.
YOU must MAKE RESTITUTION for wrongs done to others.
YOU must ADMIT GOD'S OWNERSHIP and YOUR OWN STEWARDSHIP.
YOU must PROVE your conversion by your HIGH QUALITY of life.
YOU must become DEVOTED to GOD and his KINGDOM.

May we then advise our readers who are not now satisfied to go along year after year undecided regarding their Christian life to study very carefully the above seven golden steps.

7..WHAT ABOUT SALVATION ?

1. WHAT IS REDEMPTION?

Redemption is a free gift of God to all mankind and was
de possible,as we have said,by the vicarious death of Jesus.
wever,if it is to be of any value to man it must be accepted
faith and the individual's heart and life must be fully sur-
ndered to God. Then he will proceed to work out his own sal-
tion,meantime giving what aid he can to others. The Greek word
r redeem is AGORADZO which means BUY and indicates that the
ul of each member of the human race was purchased by the death
Jesus,thus making all of us debtors to him. In other words,
all belong to God,and are expected to take advantage of his
acious plan as a first step toward our final salvation. Don't
a Prodigal except in returning to your Father.

2. WHAT IS REGENERATION ?

It is obtained through the acceptance of redemption and
e's whole-hearted surrender and glad obedience to the will of
d. The word regeneration is from the Greek PALIGGENESIA which
ans BORN AGAIN and therefore the rebirth of one's dormant spirit
gether with all its divine faculties. It is a divine miracle
ought by an invisible process but its result can be easily seen
the changed life of the individual. This change is a fundamental
e and is a MUST for all who desire to become Christians. You will
call the words of Christ to Nicodemus,"Ye MUST be born again".
it was a necessity for one steeped in religious tradition,it is
MUST for us and we should realize its paramount importance. To
tain this wonderful experience takes but a moment but it may
st for ever. Since we must have it,let us wisely seek it.

3. WHAT THEN IS SALVATION ?

We come now to consider the relation of three more great
rds which need to be differentiated - they are redemption,regen-
ration and salvation. The meaning of the first two is quite clear
rom our discussion above,but the relation of the third to the two
thers is not always well defined. In the minds of some they seem
lways confused so we need to look carefully for the fundamental
eaning of salvation. In Greek it is SOTERIA which is closely re-
ated to SOTER which means Saviour,and since Jesus has returned to
eaven,it must refer to his office and work in our behalf after the
esurrection. Therefore this word must not be confused with the others
hich have to do with our lives on Earth. Salvation is the final status
the Christian which ends in heaven. Even then we do not stop our
dvance toward perfection of the soul. To those who have thought
hrough these problems,salvation is a life-long character-building
ctivity,not an impersonal process like evolution. Don't fail to
ake Paul's advice,to work out your own salvation. And may we add one
urther thought which rises from what we have said,namely, that it
eems that Jesus is not our saviour,strictly speaking,until after
he judgment. We are not completely saved until that final hour.

8. WHAT ABOUT DEATH ?

1. WHAT IS DEATH ?

The nature of death has been defined in various ways and one of the best was stated by Dr.Henry Drummond who said that death is the cessation of all correspondences, that is,one fails to react to any stimulus. Others claim that death occurs when God withdraws his spirit from man. Still others would have us believe that death ends all because the spirit dies with the body. But we hold a more reasonable view,namely,that the spirit does not die with the body but is,no doubt,kept in an unconscious condition until the resurrection when it will receive a spirit body and move on to judgment. The spirit while resting will not be aware of the passing of time.

2. WHAT HAPPENS AFTER DEATH ?

We have already touched upon this problem but since it is a matter of much speculation we shall consider some other guesses. Some say that both body and spirit remain in the grave until the resurrection. They admit that the body will disintegrate while the spirit will continue its existence in a dormant state until that time when God will cause the various members of the body and each atom of their structure together with the reawakened spirit to assemble for judgment. After that a spirit body will be supplied to each one. Others think that the body goes to the grave and is never resurrected while the spirit goes immediately into Paradise to await the resurrection summons and a spirit body. But since Paradise is thought of as part of heaven we are at a loss to understand their point of view since we know spirits cannot go to heaven until after the judgment. We think that our bodies will not be used in judgment because they can serve no purpose in a spirit realm,but the deeds done in these bodies will be the basis of the awards that day and will determine whether we shall suffer ETERNAL punishment or enjoy EVERLASTING life.

3. WHAT ARE HEAVEN AND HELL ?

These are the places mentioned in the Bible to which we will be assigned after the great assize with Jesus as judge.

Heaven is the highest possible spiritual state,condition and place that man at his best can reach. Jesus said he was going there to prepare a place for all who were becoming his followers. The dictionaries tell us that the origin of the word is unknown but that it comes from the same root from which our English word heave came and therefore it refers to that which is high up. It is the abode of Deity and thus quite beyond all superlatives.

Hell is the state,condition and place of all the evil agencies that beset mankind. As we have noted it was prepared not for man but for the Devil and his angels,but unforgiven sinners will have to go there. Punishment there will be eternal in duration not everlasting and will end in the second death when it and all evil are to be destroyed. It is the abode of the lost.

9. WHAT ABOUT THE WORLD'S END ?

1. THE END OF THE WORLD.

This phrase is almost meaningless because it is impossible to give an adequate answer. The claims put forward by those who think it will explode or burn or be drowned by its oceans are too flimsy to merit any protracted research. This world is not going to end, but the age will end because that is the way with ages, they come and go, they have their day and leave their achievements and relics behind for future ages to examine and appraise. The Earth will remain intact as the home of the human and other creatures that may be developed during its long period of evolution. There can be no need nor value in its unnecessary destruction. It will be here, age after age after age because it is an essential part of the Solar System which is an essential part of the Galaxy which is an essential part of the universe of God.

2. RESURRECTION AND JUDGMENT.

According to the Bible and the best theological writers Resurrection is the rising into a new life by the departed spirits and it is to occur at some point in time that will fit in with God's general plan for the completing stages of his grand redemptive program. As we have remarked, the bodies of the departed will not be brought from their graves because they have disintegrated and they will not be needed since the record of each one is fully known by the judge. Then judgment will follow closely after the resurrection and it will be consummated by Christ himself and include every member of the human race from the beginning. Some say there will be two resurrections, one for saints and another for sinners, and a judgment-day for each, but they will be separated by a period of one thousand years. We, however, cannot see the need for two since Matthew reports that Jesus said that on the last day he would set the sheep(saints) on his right hand, but the goats on his left. And then the sentence will be pronounced. In reference to the saints it is said that they will go away into life everlasting, but the wicked into eternal punishment.

3. WHAT OF THE SECOND COMING ?

Regarding the second advent of Jesus we wish to make four statements to aid in its understanding.

FIRST - We think that since the common expectation of the early Church was not fulfilled during that time, and since it has not yet occurred, that those who still persist in this belief must also be in error in this matter.

SECOND - We hold that if those people had been good students of the gospel of John they would have seen how he spiritualized Christ's second coming in their own time, and they would have prevented the error from worrying most people until now.

THIRD - We feel that all who still try to believe that Christ will come again in physical form should cease to cling to the ancient error and join with us who are watching for his silent emergence in the hearts and minds of his people.

FOURTH - We therefore declare that we cannot longer accept the idea of his coming in physical form, nor of a reign for a thousand years on Earth, nor of a judgment-day on the Earth.

10. WHAT ABOUT THREE EVENTS ?

Noah's Flood

That a very great deluge did really occur is now accepted as an historical fact, not only because the story is found in the Bible but also because mid-eastern peoples have left similar records of a similar great catastrophe. But it is difficult to know for sure whether they were careless copies of Noah's inundation dressed up in oriental fashion,or bonafide records of their own.

In recent years it has been reported that parts of an ark were found somewhere on the Ararat mountains, and that some keen archaeologists,digging in ancient Babylonian cities,uncovered a broad layer of sand and silt which must have been deposited by such a flood of water. But geophysicists have not been able to determine how much land surface stood above the surrounding ocean of the eastern hemisphere in Noah's day,and therefore the extent of the flood is beyond computation. It was not world-wide,because even a cloud-burst for forty days could not rise above Mt.Everest.

Tower of Babel

That a great tower was commenced in the Valley of Shinar in Babylonia is also received as an historical fact,not only because the Bible says so but also because archaeologists have found its ruins. The word Babel means Gate to God because this tribe was set on having it reach 'unto heaven',and this would be a rallying place for keeping the tribe together. But the Divine plan for them was that they should be scattered so that the true worship of Jehovah, the one God,(Monotheism) should spread over the then known earth. To obtain this result it was necessary for some unusual event to transpire that would cause them to separate and travel to other parts. A confusion of their language is said to have been the remarkable method used by God,and some scholars claim that BABEL comes from BALAL which means CONFUSION but we wait for much more conclusive evidence on which to build a satisfactory explanation of this age-long problem.

The Red Sea Crossing

This,at first thought,seems more difficult to explain because the actual place of crossing is not mentioned, and the Red Sea itself is one hundred or more miles across and two thousand feet deep. No doubt then they sought a much narrower place where they could hope to escape the Egyptian armies. Turning northward they came to the Gulf of Suez which is one hundred and seventy miles long, twenty-five miles across and two hundred feet deep. As they moved along the shore they discovered a narrower place with shallower water and at once pitched camp,and what a camp,there were thousands of soldiers,tens of thousands of people and hundreds of tons of baggage ,provisions and pack and food animals. But they were not to stay long.A rushing wind began to blow the water from that shallow,as it does today,and soon a passage appeared and Moses gave the order to break camp and they were on their way.

11. WHAT ABOUT DIVINE JUDGMENTS ?

Their causes

Acts of God are difficult to appraise. We may be sure,however,that the records in the Bible are true when they list the causes of divine punishment as disobedience,idolatry, immorality,inhumanity and selfish ambition. These are some of the apparent causes and there are others which are not apparent out just as real. Sometimes when we see or read of inhuman acts of cruelity perpetrated on a large scale we wonder why God does not cause judgment to fall immediately upon the guilty sinners. Perhaps we are in a too great hurry to see justice done,while God waits for the offenders to confess or uses the unseen scourge of bitter remorse or accusing memory to punish,or at least, to shame the unrepentant criminals. One thing is sure,Divine justice will be perfectly fair and wisely done,so that we will not have to ask Abraham's question,"Shall not the Judge of all the earth do right?"

Judgments on the Hebrews

According to the Bible the progenetors of the Hebrew people felt the first fell stroke of Divine judgment when Adam and Eve were driven from the Garden of Eden on account of their disobedience. They confessed their sin but didn't ask for pardon and went out into the world to labor and suffer under a curse.

The judgment of the Flood was also caused by the sins of the people who were the descendants of the so-called Sons of God who took the daughters of men as wives and reared a tribe of giants whose ability to engage in sin of all kinds soon caused God to destroy all life in that part of the world.No known natural cause can be assigned to it.

The judgment in the Confusion of language at Babel is upon the sin of trying to circumvent the purpose of God. The people sought centralization, God wished to scatter them over the earth to insure the spread of Monotheism.

Judgments on the Heathens

Here we find three outstanding occasions:- curiously enough it may be said that we have a tale of two cities and two tales of one city. The two cities were Sodom and Gomorrah while the one was the capital of Egypt whose Pharoah was Mernephtah at about 1300 B.C. As we all remember the story of the destruction of the two cities of the plain by fire from heaven we need not tell it.

The two tales include the ten plagues visited upon the Egyptian people and the signal destruction of their armies in the returning waters of the Red Sea. The ten plagues were sent because the king would not let the Hebrews go but continued to keep them as slaves; but when they finally freed them they sent their army to bring them back. But by the Divine direction through Moses they succeeded in a never-to-be-forgotten escape.

12. WHAT ABOUT DIVINE CHOICES ?

Their reasons

In offering this brief discussion may we say again that
he acts of God are difficult to appraise, and this because we do not
ossess the wisdom nor the perspective to fully understand and
xpress the spiritual elements involved. Again, not all the reas-
ns are apparent and therefore we must, with our limited insight,
ry to perceive what is essentially basic in the Divine purpose.
This will be found, in the first instance, in man, and then in God.
ome of the reasons which God sees in man, either as an individual
r a group or race, are the personality and character which include
onesty, integrity and dependability. These are not visible in man
ut they are very real, and when added to the Divine attributes
ecome a perfect basis for God's choices.

Are they predestined?

No, nothing on this level is predestinated because men is a free agent and fate is little more than an intellectual ghost. We admit that there is a place for chance but not for such a meaningless vagary as fate. Predestination would do away with freedom and foster fatalism which would destroy God's finest gift to man. When God calls or chooses any individual or group of persons for a particular task he does so with all the details of the case before him, and this means that he will not, arbitrarily, ignore nor supersede his prior commitments. No, God's choices are not, and cannot be considered as predestined, they may be predetermined.

Are they irrevocable?

No, nothing at the human level is fixed for all time. Sometimes people suggest that it would have been better if we had been made so that we could not sin, but that would have made us mere pucks or pawns of fate. We shall not barter our glorious freedom for anything. Nor shall we allow it to be filched by anyone. Divine choices are revocable by their maker as has been shown by his dealings with various peoples.

END OF FIRST PART

--- PART TWO -----

1 . WHAT ABOUT THE BIBLE ?

1. WHAT IS IT?

The Bible is the most important collection of books in he world and is the only written record of God's progressive elf-revelation to man. It was produced through many years by any men whose unusual religious experience marked them as divnely inspired reporters of the revelation of God amd his message o mankind. It is similar to all other sacred books in that it ortrays the highest moral and spiritual ideals of its religion. ut it is different from all other sacred books in the exalted ange of its ideals. Indeed there is no proper comparison between hem but only a wide contrast which has been noted for generations. f any reader desires to look further into this matter he can find reat satisfaction in many excellent books on the world's religions.

2. WHAT DOES IT CONTAIN ?

In setting forth this revelation it has utilized many ources of information and various mediums of literary and scientific resentation. The facts and events portrayed cover the fields of istory, Law, Poetry, Prophecy and Biography so that the ideas ecorded may have the best possible background and trustworthiness. According to these inspired writers the furnishing of the pre-existing universe with all its original racial types was brought into being by the will of God. Man,the highest and most important of these types became sinful by obeying Satan rather than God,so that the Bible is largely a detailed presentation of his ignoble activities. They tell the tremendously important news that in the fulness of time, when the Roman power was greatest and the Greek language was in common use in the then known world,and the methods of communication were most highly developed, that then God decided to make a way of escape for mankind from the consequences of his sin through the willing vicarious death of Jesus on the cross. There is also the inspiring story of Jesus with his wonderful teaching and of the choice of his disciples who turned the world upside down,and of the remarkable conversion of the apostle Paul and his subsequent activities, as well as the marvelous resurrection of Jesus. With this redemptive scheme both the Old and the New Testaments are in full accord,while the history of the Christian Church of that time contains the classic story of the supernatural achievements in the hearts and lives of thousands of people.

3. WHAT IS INSPIRATION ?

The inspiration of the biblical writers was,no doubt,a special gift of God bestowed on certain men to enable them to discover the basic truth in,and the proper interpretation of the events and instructions which they recorded. It is still a gift of God to those who seek it for his glory,and it is mediated through the Holy Spirit as indicated under ~~B of~~ article 1. Some claim that these men became mere tools of the Spirit,but we think that would make the Spirit of God responsible for what errors are found in their work.

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WHY USE TOBACCO?

~~3. III~~

Why do so in total disregard of the advice freely given by the outstanding specialists who have informed you about this poisonous plant and the pernicious habit its ab-use produces?

Why continue to show how selfish and inconsiderate you can be of the rights of other people including little children?

Why become saturated inside as well as outside with the disagreeable odors that nauseate non-smoking people? Why be a carrier of your personal weakness and foolish habit everywhere you go?

Why disregard the rule in railway coaches and fill them with tobacco smoke that spoils the ride for non-smokers? Why get so fighting mad when one asks you to go to your own compartment?

Why carry your disgusting habit into places where food is prepared and served? Can you not desist long enough to eat your meal? What a slave you are.

Why fill the atmosphere with poison in your home where little children who cannot protest must swallow your second hand breath?

Why set fire to your money and be a party to the staggering fire losses across the country? That is not patriotic.

Why be a dupe of the tobacco interests and commit suicide inch by inch? When did that become a wise procedure?

Why do some firms allow their men to smoke at work when they know that it has been proved by the ergograph that their efficiency suffers?

Why do many doctors, who know its harmful effects, still use it and some of them even lend their names for a consideration?

Why do many school boards employ smoking teachers who do not care about their influence and example before the boys and girls?

Why do some stores permit their clerks to smoke while serving customers? Do not the clerks know any better?

Why do some Sunday School superintendants and teachers use it? Do they think that the children cannot smell their breath and clothes?

Why do many churches accept indulgent ministers who practice this disgusting habit and are thereby disqualified as true religious leaders?

Why do girls and women stoop to such an obnoxious, indelicate and unworthy practice? Does it make them more popular with some? Yes, but who are they?

Why do expectant mothers smoke when they are told that in thousands of cases it stamps the children with weak eyes, weak bodies and weak lungs?

WHY NOT REFUSE?

Why not be strong, refuse to please this god?
Why not be clean, reject this foul ab-use?
Why not be right, keep conscience pure as gold?
Why not be brave, stand firm against its use?

Why not be bold, let all men know your plan?
Why not be good, make your example tell?
Why not be kind, act like a gentleman?
Why not be wise, save cash and health as well?

W.G.C.

Western Libraries acknowledges missing content from the original manuscript.

Page 822 is missing from the scanned images of the manuscript.

A HOLIDAY TRIP TO THE PLANETS

~~Part I - By W.S.Colgrove.~~

AT A THOUSAND MILES AN HOUR INTO SPACE

If speed is essential in our limited mundane movements it is surely a ue necessity when we undertake interplanetary travel and so for our present ise we shall suggest a velocity of 1,000 miles per hour. We are not now intsted in the kind of space-ship we shall use except that it can attain that ed with plenty of margin to spare. Nor shall we worry about the details of omodation except that we shall be fully provided for during our long voyage le we visit each of the planets. Indeed we shall simply use our imagination let an imaginary committee look after all necessary arrangements.

The itinerary which this group has prepared will take us directly to the n and then to the sun as centre from which we shall fly to the planets in the lowing order:- Mercury,Venus,Mars,Jupiter,Saturn,Uranus,Neptune and Pluto and n cruise swiftly home again. To do this with the least lost motion we assume t all the planets will lie in a straight line outward from the sun . Our object this extended voyage is to find out what we can about the physical conditions, possible inhabitants and their appearance,their occupations and their way of e,in surroundings very different from our own.

If then,we board our enormous space-ship we shall find it already pointed ard the sun and soon the giant siren will blare~~s~~ a deafening blast to announce the g awaited take-off. This is a very intense moment for all on deck and some ress their misgivings about the wisdom of the undertaking. But it is too late, e earth seems to be falling away from us and silence becomes master on all sides. t after an hour on our way the folks begin to talk and soon we are informed that e Moon will be our first stop and we can see a very thin crescent of it as it owly moves away from new Moon position in front of the blazing sun. We have now en flying for a week and covered 168,000 miles and thus passed the limit of the rth's attraction so that now the Moon's attraction will begin to be felt as we iftly draw nearer to our satellite. Only three days remain in which to complete e lunar trip and the 72,000 miles will soon be left behind us. But before we nd we shall sweep around this strange looking sphere to gaze on the other side ich has always been hidden from us when on the earth. When we arrive we discover me very odd geological formations,some rugged mountain chains and thousands of aters whose origin is thought to be volcanic and meteoric. Here too we find no r to breathe,no water to drink and no food to eat,no fauna and no flora but only sert areas pierced by these jagged rockyoutcrops.What a place,what a death valley! en,turning to our instruments,we see that the temperature is about 250 degrees F. d this because there is no atmosphere to ameliorate its severity. The dark side far beyond that point below zero. It is the frigid cold of outer space. The on's diameter is only 2163 miles but its mountains are about as high as ours d many of its 30,000 known craters are much larger than any on the earth. We nnot stay longer so we shall knock off some lunar fragments to study on our n-bound flight.

Again the siren sounds the takeoff ,It took us only 10 days to reach the on but it will require 10 years to arrive at our next stop. As we speed through ace toward the glowing sun we become aware that it appears to be increasing in ize and we remember that its diameter is 864,000 miles and it would take 80 year o walk around it at 4 miles per hour. Long before we reach it we ~~could~~ can not help t be amazed at its great size because its vast limbs would cover much of the sky oth to the right and the left as well as above and beyond us. We also see the ~~se~~ rth and the Moon apparently receding into the distant darkness until it looks ike a very small sunlit disk millions of miles away, and in that limitless perpective of space we ~~were~~ are forced to contemplate the unimportance of our planet. ive years have already passed and we are half way there and still flying at our nitial speed of 1,000 miles per hour. We are now feeling the powerful attraction f the sun and in a few more ~~decades~~ hours we shall have to stop all motors and carefully lide the rest of the way until it becomes necessary to turn them on again but in everse because the attraction of the sun at its surface is 28 times as great as n the earth.

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in the way our [illegible]
horizons and, mirabile dictu, this comedy was repeated more than three
times every 24½ hours.

Jeans - 1.98 -
Pants -
Suit coat.

825

A Holiday Trip to the Planets ~~Part I~~

As we approach this colossal sphere of glowing gas we do not have to be
oout its awful heat of 10,500 degreesFand its blinding light of 3 octillion
power for we are there only in imagination. Soon we made a fearless landing
re treated to a vast display of fireworks when several enormous jets of gas
prominences rocketed from the sun into space some 250,000 miles and made great
or spots anywhere from 10,000to 50,000 miles across. If these holes were
into a hollow sun that sun could contain 1,300,000 earths. And now we must
our way again,this time to a real planet named for the god of speed.

The little illusive planet Mercury is about 36 million miles beyond the
d the trip will consume a little over 4 years of our precious time at our
e speed. The siren sounds again and we are off,off after a planet that is
ing around the sun 117 times as fast as we are flying but we imagine we can
land on it when we wish. Strange to say,it seems to keep the same hemis-
toward the sun by rotating on its axis only once during each revolution of
s duration. This circumstance causes the heat on the sunward side to become
ense that at perihelion it reaches over 700 degrees F.and the softer metals
a molten condition while on the other side which is always dark the temp-
e sinks close to absolute zero. This continual intense heat ,according to
riters,has produced great cracks all/over the sunlit hemisphere so that ~~tr~~
l is very dangerous. Its diameter is only a little more than 3,000 miles and,
the Moon,it has no atmosphere,no water and no food. We move about in search
gns of life but find none,not even relics nor fossils of any kind but we
r the molten gold in pots and store it in our air-conditioned compartment to
As we survey this bleached and half wrecked planet we decide that it is time
ave the place and so we prepare for our next stopping place,the very brilliant
t Venus.

On this part of our trip we travel only 31 million miles and accomplish
about 3½ years to find that the planet's brilliance is due to the presence
thick cloud envelop which surrounds the entire sphere and cuts off the whole
rom ~~their~~ view. When we arrived we had to plunge directly into and through
loud to reach the surface which would have been very dangerous if we were
ut our radar equipment. Once safely landed we sought for a division somewhere
e cloud through which we might check on the rotation period but none could
und during our stay on the planet. We remembered,however,that the diameter
nus is about 7600 miles and that it is a very good twin for the earth which
out 7900 miles through,that its orbital velocity is 25 miles per second but
period of rotation is not yet known. Some writers say that,like Mercury,it rot-
only once during each revolution and therefore keeps the same hemisphere
s toward the sun;others feel almost sure that it rotates in about 30 days.
pe that the astronomers on Mount Palomar,with their unique equipment,will be
to solve this difficult problem. With regard to surface features we who are
he ground can vouch for some self-evident facts for we have found that the
loping cloud is truly an awful hinderance,not only to air navigation,but also
n understanding of the universe outside. The excessive moisture and the trop-
heat are very oppressive since Venus is only 67 million miles from the sun
h it circles in about 225 days. Strange as it may seem,we found no signs of
al life but only vast forests and jungles of tropical trees,shrubs and vines
from time to time fall in tangled masses to gradually form potential coal
ures for some distant future race to enjoy. May we say then that people like
elves cannot exist on this planet at the present time,and our advice to all
ring space travelers is,"Don't go"! And now we shall prepare for our next
of call,the ruddy war planet Mars.

ave long since been extinguished,

We were thrilled at night by the appearance of Mars' two little
moons that are not more than 20 miles across and set so strangely.
It was almost breath taking to see one rising in the east and the other
in the west and then passing eachother somewhere between the two
horizons and, mirable dictu, this comedy was repeated more than three
times every 24½ hours.

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MARS

A HOLIDAY TRIP TO THE PLANETS

~~PART II. BY W.O. COL[illegible], M.A., B.D.~~

In this trip from Venus to Mars we have to cover 74 million miles and, at 1000 miles per hour, it will take slightly more than 8 years and we are all trying to guess the appearance and nature of the inhabitants we expect to meet when we set down our mighty space-ship on that interesting ~~little~~ planet which is only a little more than 4000 miles in diameter. Mars rotates, to make day and night there, in 24 hours and 37 minutes which is only about a half hour longer than an earth day and it revolves around the sun in 687 earth days or nearly two earth years at 19½ miles per second. Some writers seem to think that people live on Mars and we have been asked if we have ever seen anybody over there through our big telescope but, of course, we have to answer in the negative because to be seen with some of the largest telescopes any object would have to be about 10 miles long or across. Now people of such dimensions would be enormous. Think of meeting a man several miles high or a woman that far across. Needless to say there are no such gigantic beings anywhere in space. If such a gargantuan creature should shout he would rattle the Rockies. And, as for other ordinary folks, astronomers do not think any exist on Mars.

(We might have chosen to go at a more favorable opposition when the distance would be less than half as great but in this cruise we are using the average distance from the sun for each of the planets.)

Eight years have now passed and after circling Mars in continual daylight by lowering our speed we have been able to examine its polar white caps, its ruddy areas in the temperate zones and its greenish areas around the equator. And now with reversed motors we glide in to a happy landing just beside the "Eye of Mars" a little lake called Solis Lacus, which means the lone lake, and it is noon with the temperature at 80 degrees F. This heat is only temporary for, on account of the rare atmosphere, Mars cannot hold it and by nightfall the mercury drops to around zero every evening and by early dawn it is far below that point. Added to the rarity of the atmosphere there, is the distance of 141½ million miles between it and the sun. There are but few clouds and rain seldom falls so that the vegetation in the green areas is quite scanty and of poor quality and can grow only beside the salt marshes and small inland bodies of water. The reddish areas proved to be nothing more than desert sand and small rocky ranges from which the iron and other metals have long since been oxidized.

We were thrilled at night by the appearance of Mars' two little moons that are not more than 20 miles across and act so strangely. It was almost breath taking to see one rising in the east and the other in the west and then passing eachother somewhere between the two horizons and, mirable dictu, this comedy was repeated more than three times every 24½ hours.

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Mars

A 'Holiday Trip to the Planets

Now the question arises, "Can folks like us live on Mars"
and the answer is manifold and in the negative;

1. We cannot get there, except in imagination, even at the speed of light or thought.

2. We cannot breathe there because the atmosphere is
rare, unless we carry sufficient oxygen with us.

3. We cannot eat there because the vegetation is so
poor and no doubt of a kind similar to our marsh grass and reed
and most of the food animals if any have probably disappeared centuries ago.

4. We cannot drink there because there are probably no
springs nor streams but only sluggish pools and marsh w
to be found.

5. We cannot put up with the unbearable temperature
crowd in from space every night and especially in the winte

6.

(2) to enable other communities to profit from the experience in London to promote and conduct similar institutes.

Yours truly,

Odin W. Anderson

Odin W. Anderson, Ph. D.
Assoc. Professor, Clinical Preventive Medicine.,
Chairman, Division of the Needs of the Aged,
London Council of Social Planning.

OWA/

EXTRAS

XXIV

EXTRAS

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A list of things I could not put in the book.

The Chart of World History
Three by six feet
The Prismatic Piano Model
Electric control
Three University Diplomas
Western,McGill,Boston
The Roller Star-Map
Three by five Feet
The ten astro-lecture charts
Three by four feet
A 6-foot portable Foucault Pendulum
Over a large sphere
A set of hollow wooden planets
To suit a 9-foot Sun
A large composite map of the Moon
Made from 18 photos
A large white-board 3-feet square
To receive images of Sun
A 3-foot circular star-map with
myths drawn in color
A large perspective drawing in color
of each church I served
Several enlarged Bible maps for S. S.
for platform addresses
Made architectural drawings for a gym,
a church,a parsonage and a stellarium
Several bird's-eye wash drawings of
large factories of various kinds
Some pieces of Clay modeling including
Busts of Gladstone, Dr.Fox and Myself
as well as a3-foot statue of two
gladiators,one slain,one victorious
A working nodel of the 200-inch Hale telescope
the scale is one to forty
The annual prize of the Board of Governors
of Mc.Gill Univ. for Philosophy
The Medal of the Royal Astronomical Society
of Canada for outstanding work
The Silver Tray of the University of W.O.
For Devoted Service

W.G.C.

A large Astronomical Scrap-Book
from many books and magazines

	CUTS CUTS	WHERE
Chap.I.	No cuts necessary	
Chap.II.	8 ,, for circles	here
	1 of Display in Lib.	F.P.
	1 for Beth.Star art.	F.P.
	1 of Chant Medal	F.P.
Chap.III.	1 of 7 portraits	here supply photo
Chap.IV.	1 of Night Bloomer	F.P.
	1 of Witch Broom	F.P.
	1 of Display in Lib.	F.P.
	1 of W.G.C. and M.A.B.	here supply photo
Chap.V.	No cuts necessary	
Chap.VI.	4 ,, of churches	here supply photos
	1 of the parsonage	here " "
Chap.VII.	5 large, two small	F.P.
Chap.VIII.	NO cuts necessary	
Chap.IX.	No cuts necessary	
Chap.X.	1 of original planetarium	here photo
	1 of motorized "	F.P.
	1 of Sotellunium ~~original~~	F.P.
	1 of Spark's telescope	here photo
	1 of my Refractor "	here "
	1 of univ.in a nut-shell	F.P.
	12 of Know Your Stars and 1 of 200 inch	here cuts
	1 of two Galaxies	here photo
	1 of planetary family	here photo
	1 of W.G.C.and instruments	F.P. Apr 1952
	1 of a Sales Sheet	F.P.
	1 of the first large Sotellunium	here Photo
	1 of Sun-spot display at Obs.	F.P.
	1 of the 200 inch model	F.P.
	1 of four views of "	here photos
	1 of drawing of the Sun	here cut
	1 of the Dresden Meteorite	here cut
	1 of two Stellar Radiants	here photo
	1 of Mars and its moons	here photo
	1 large of Dr.Kingston and scope	F.P.
	1 of the Sotellunium family	here photo
	1 of Planetary Paths	here "
	1 of the Display at the Library + FAIR.	F.P.
Chap.XI.	1 of Mr.Land for the Blind	F.P.
	1 of the Prismatic Piano	F.P.
	3 for Pocket Base-ball game	here cuts
	1 of Hair clipper, graduate	here drawing
	1 of Turtle Dove, Sport Car	here "
	1 of Mechanical Designer	here "
	1 " Wall Baseball Game	here
	4 of Funny Face Family	here photos
Chap.XII.	1 of Dresden Meteorite	here photo
	1 of four pictures	here photos
	1 of three pictures	here photos
Chap.XIII.	1 of largest Sun-spot	here photo
	1 of two Sun-spot pictures of Charts	F.P.
	1 of Astronomy-Venus at midday	here photo
	1 of U.W.O.Front Door	here "
	1 of Astronomical Foursome	here "
	1 of Group from Lucknow, Ont.	F.P.
	1 Dr.Kingston testing the Sparks Tel	F.P.
	1 of a Trip to the Moon, Rocket	F.P.
	1 of W.G.C. the new president	F.P.
	1 of three pictures of Comet etc.	F.P.
	1 of preacher views comet.	?
	1 of W.G.C.explains Sotellunium	F.P.
	1 of group viewing an eclipse of Sun	F.P.